CHAPTER 51

LIST OF EFFECTIVE TEMPORARY REVISIONS

FOLLOWING IS A COMPLETE LISTING OF ALL ACTIVE TEMPORARY REVISIONS (TR'S). TR'S NOT LISTED SHOULD BE REMOVED. THE ATA NUMBER, CONFIG CODE AND PAGE NUMBER IDENTIFIES THE PAGE PRECEDING THE TR.

TR NUMBER	ATA NUMBER	CONFIG CODE	PAGE NUMBER	TR DATE

NONE

CHAPTER 51

STRUCTURES

LIST OF EFFECTIVE PAGES

CHAPTER/ SECTION	PAGE	DATE	CONFIG CODE
List of Effective Pages	1/2	Dec 15/91	
Table of Contents	1/2	Nov 15/89	
51-conts	1/2	Jul 15/83	
51-INDEX	1/2	Jul 15/84	
51-00-00	1	Aug 15/81	
51-00-00	2	Dec 1/71	
51-00-00	3	Aug 15/81	
51-00-00	4	Mar 15/73	
51-00-00	5	Aug 15/81	
51-00-00	6	Aug 15/81	
51-00-00	7	Nov 15/86	
51-00-00	8	Nov 15/86	
51-00-00	101	Nov 15/82	
51-00-00	102	Nov 15/82	
51-00-00	103/104	Nov 15/82	
51-01-00	1	Nov 15/81	
51-01-00	2	Aug 15/82	
51-01-00	3	Aug 15/82	
51-01-00	4	Nov 15/81	
51-01-01	601	Jul 15/83	
51-01-01	602	Jul 15/83	
51-01-01	603	Aug 15/82	
51-01-01	604	Aug 15/82	
51-01-02	701	Aug 15/82	
51-01-02	702	Aug 15/82	
51-01-02	703	Aug 15/82	
51-01-02	704	Aug 15/82	
51-09-01	701	Nov 15/74	
51-09-01	702	Nov 15/74	
51-09-01	703/704	Nov 15/74	
51-10-00	1	Nov 15/88	
51-10-00	2	Nov 15/88	
51-10-00	3	Nov 15/88	
51-10-00	4	Nov 15/88	
51-10-01	401	May 15/86	
51-10-01	402	May 15/86	
51-10-01	403/404	May 15/86	
51-10-02	401	May 15/86	
51-10-02	402	May 15/86	
51-10-02	403/404	May 15/86	
51-10-03	401	May 15/76	
51-10-03	402	May 15/76	
51-10-03	403/404	May 15/76	
51-10-04	401	May 15/76	
51-10-04	402	May 15/76	
51-10-04	403/404	May 15/76	
51-10-06	601	Mar 15/83	
51-10-06	602	Nov 15/82	
51-10-06	603	Mar 15/83	
51-10-06	604	May 15/88	
51-10-06	605	May 15/88	
51-10-06	606	Mar 15/83	

CHAPTER 51

STRUCTURES

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DRAIN VALVES - FUSELAGE Inspection/Check	51-01-01	601	ALL
DRAIN VALVES - FUSELAGE Cleaning/Maintenance	51-01-02	701	ALL
EXTERIOR SURFACES Cleaning/Painting	51-09-01	701	ALL
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MAST - KEELSON DRAIN Removal/Installation	51-10-01	401	ALL
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FAULT CODE INDEX
TABLE 1

	FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
	51 00 00 00	1. NOT USED.
	51 00 01 00	1. Vibrations Inc/Dec with change in aircraft speed or attitude. Power was constant. (Ref. Chapter 71 for Fault Code diagram.) 2. 51-00-00 Fig. 102 Block 1
R	51 00 02 00	1. Vibrations Inc/Dec with change in aircraft speed or attitude. Power was constant. (Ref. Chapter 24 for Fault Code diagram.) 2. 51-00-00 Fig. 102 Block 1
R	51 00 03 00	1. Vibrations Inc/Dec with change in aircraft speed or attitude. Power was constant. (Ref. Chapter 29 for Fault Code diagram.) 2. 51-00-00 Fig. 102 Block 1

STRUCTURES - DESCRIPTION AND OPERATION

R 1. General

R Aircraft structure (Ref. Fig. 1) is designed for maximum
R structural strength with minimum weight while meeting the
R requirements for a long service life, high degree of
R reliability, and low frequency of repair.

The airframe incorporates fail-safe structural load paths so that failure of any one element will not endanger the aircraft. The fuselage structure can withstand limit-pressure loads in
R addition to normal structural loads following failure of a fuselage frame, or a fail-safe strap and a skin crack.

The primary structure is designed so that a major structural component, such as a wing or a stabilizer, does not have to be replaced due to fatigue or corrosion damage during the life of the aircraft.

Shot-peening is used to improve resistance to stress corrosion. Interference-fit fasteners are used in many areas to increase structural life. All permanent fasteners are installed wet with a corrosion-inhibited, rubber-like sealant to reduce metal-to-metal contact, fill crevices, and to prevent entry and entrapment of moisture.

R Materials most commonly used throughout the structure are high-strength aluminum, titanium, and steel alloys, which are selected according to the type of loads imposed.

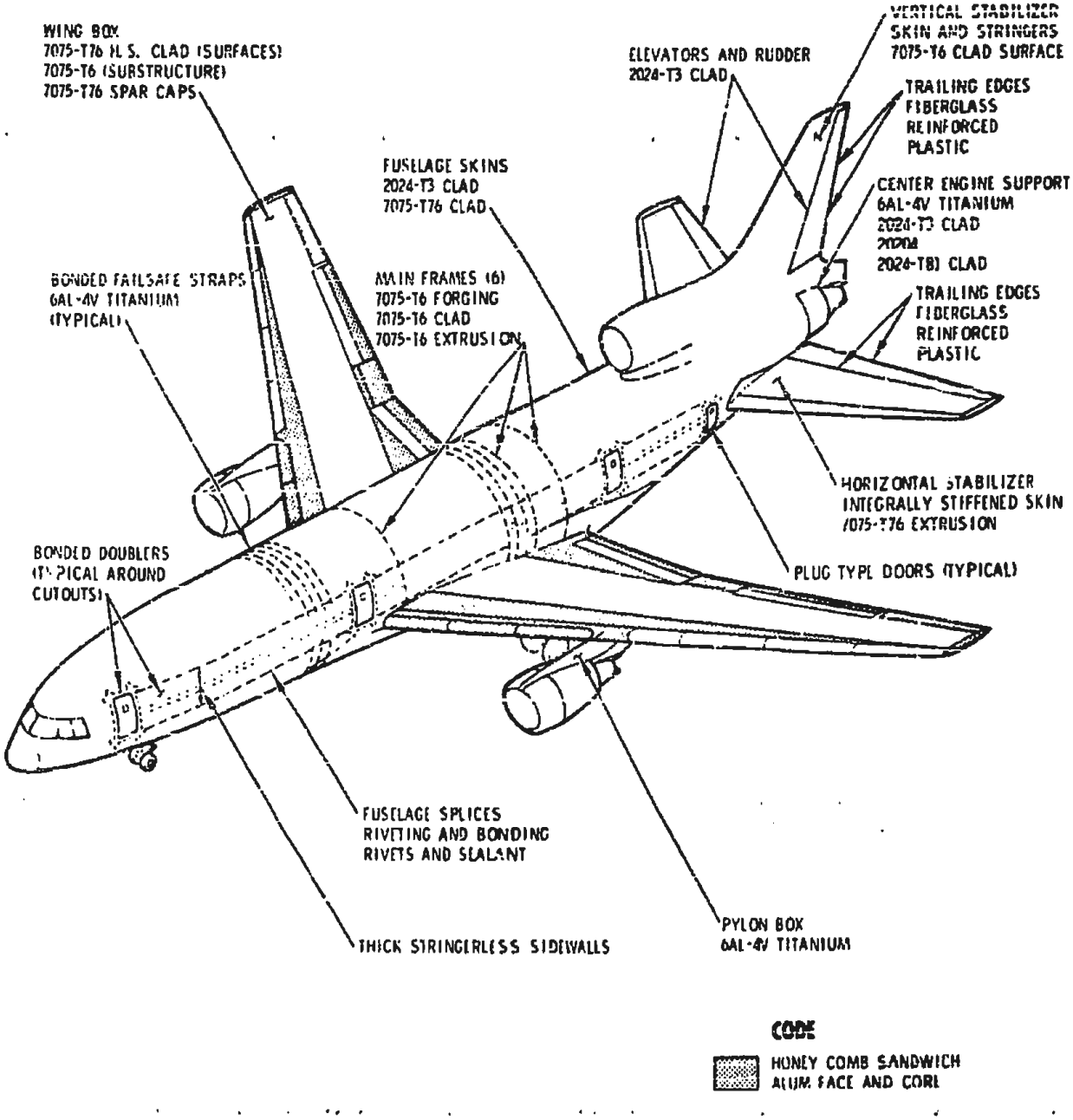
Fiber glass and aluminum honeycomb core materials are used extensively on secondary structure and on many of the flight control surfaces.

A. Fuselage

The fuselage (Ref. Fig. 2) is a semimonocoque structure
R composed of six barrel sections and the fuselage afterbody
R section which supports the No. 2 engine and empennage.

R Passenger and cargo compartments are pressurized.
R Unpressurized areas of the fuselage are the radome,
R environmental control system compartments, nose and main
R landing gear (MLG) wheel wells, hydraulic service center,
R and the fuselage afterbody.

The fuselage floor at WL 200, located 19 inches below the fuselage centerline, is supported by transverse floorbeams at each frame, except in the wing box area and MLG wheel



A11-A00-51-002

Airframe Details
Figure 1

EFFECTIVITY: ALL

050B

R wells. The floor over the wing box is supported by
R longitudinal intercostals attached to the top of the wing
R box, which is also the pressure boundary. Over the MLG
R wheel wells, floor and pressure deck below the floor are
R supported by transverse beams with intermediate support by
R keelson shear beams.

The keelson structure forms the longitudinal support of the lower fuselage through the wheel well area. The keelson, which is connected to the lower wing surface by shear webs, extends beyond the wheel wells at each end for load distribution.

The fuselage structure is constructed of bulkheads, frames, formers, and stringer-stiffened skin panels.

R Fuselage main frames, made of aluminum forgings and
R extrusions, distribute wing and landing gear loads into the
R fuselage structure. Fuselage outer skin panels are
R heat-bonded assemblies made of aluminum alloy sheet and
R titanium fail-safe straps.

The fuselage afterbody is constructed of bulkheads, frames, formers, and stringer-stiffened skin panels. The structure
R is fabricated of aluminum alloy sheet, extrusions, machined forgings, corrosion-resistant steel, and titanium.

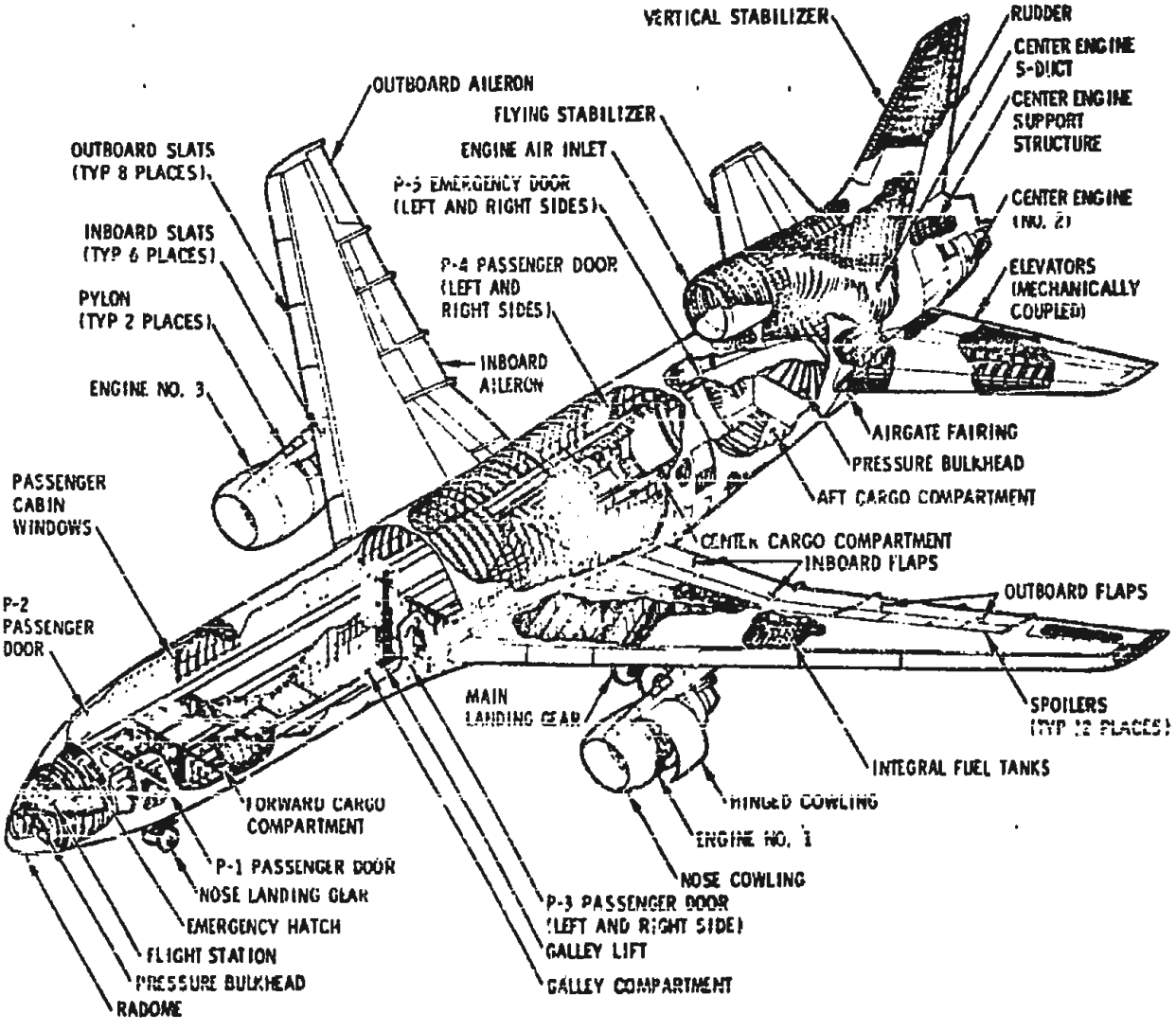
B. Wings

The wing primary structure (Ref. Fig. 2) consists of a center box structure permanently fastened to the left and
R right wing box structures. Left and right main wing box
R structures are cantilevered from the wing center section,
R which is enclosed within the fuselage. Wings are tapered
R and swept back from the wing center section.

The outer wing box structure consists of forward and aft spars, chordwise rib structure, and upper and lower skin
R panels. The spars consists of cap and web construction with
R doublers and stiffeners. Ribs are strut-truss, or
R reinforced-web type structure. Upper and lower skin panels
R are stiffened by spanwise stringers. Outer wing boxes are
R compartmented and sealed to serve as integral fuel tanks.

R Wing center box section consists of five spanwise beams and
R upper and lower surface stringer-reinforced skin panels.

R Wing leading edge structure is cantilevered forward from the
R front spar. The trailing edge is cantilevered aft from the
R rear spar. The inboard section of the trailing edge has
R auxiliary and intermediate beams to support the skin panels
R and flight controls.



MU-0101-51-001

Structure Index
Figure 2

Wing control surfaces include ailerons, slotted wing flaps, spoilers, and leading edge slats.

C. Empennage

The empennage (Ref. Fig. 2) consists of vertical fin, one-piece rudder, controllable pivoted horizontal stabilizer, and hinged elevator.

The vertical stabilizer is composed of a removable leading edge, box beam, trailing edge, and removable tip. The box beam is constructed of front, rear, and auxiliary spars; ribs, and stringer-reinforced skin panels. The spar assemblies are made of extruded spar caps, sheet aluminum webs, and extruded aluminum alloy stiffeners.

The leading edge consists of four removable sections.

R R R The trailing edge structure includes the rudder support fittings and access panels. The access panels are hinged to provide access to the rudder control system and rudder hinge fittings.

The one-piece rudder assembly is composed of a box structure, leading edge shroud assembly, and fiber glass trailing edge. The leading edge shroud consists of shroud formers with fixed shrouds and removable shroud sections which serve as access doors. The box structure is an assembly of front and rear spars, ribs, and aluminum alloy skin panels. The tip assembly is removable in two pieces.

The horizontal stabilizer is a one-piece assembly consisting of a center box section joined to the outer stabilizer box sections with permanent-type fasteners.

The horizontal stabilizer is composed of front and rear spars of stiffened web construction, chordwise ribs, and integrally stiffened aluminum alloy skin panels.

R R R The horizontal stabilizer is attached to the fuselage afterbody with pivot-hinge bearings at FS 1975.0 and WL 227.0. Pivot bearings are located on the rear spar. Hydraulic actuators support the forward end of the stabilizer at attach fittings on the front spar.

An airgate fairing is installed on the inboard side of each outer stabilizer panel. The airgate fairing is provided to seal the opening in the fuselage which accommodates the horizontal stabilizer box displacement. The airgate fairing consists of beams, formers, and skins assembled into a box structure. A preformed, fiber glass reinforced, silicone-rubber seal is installed on the outer edges of the

airgate structure. The airgate fairing is attached to the horizontal stabilizer at the leading edge, and at the front and rear spars.

D. Nacelles/Pylons

R Three engines (Ref. Fig. 2) are located on the left and
R right wings and in the fuselage afterbody. Wing engines
R [No. 1 (left) and No. 3 (right)] are pylon-mounted. Each
R pylon consists of a main frame, leading and trailing edges,
R fairings and attach fittings.

The main frame is constructed of machined titanium forgings, titanium sheet and extruded stiffeners, titanium plate and sheet webs, and skin panels.

The drag strut is machined from a steel forging.

R Pylon leading edges are constructed of aluminum alloy skins and stiffeners.

The trailing edge structure, which is made of aluminum, is covered with fiber glass honeycomb skins.

R All fairings, except the trailing edge wedge, are made of
R aluminum alloy construction. The trailing edge wedge and
R glove fairing skins are made of fiber glass.

The center engine fixed inlet assembly consists of five frames, Z-stiffeners, outer skins, duct skins, stringers, and fittings. All of the above structure is of aluminum construction except the titanium frame located at FS 1631.5.
R Z-rings are used to duct skin and outer skins.

The fixed inlet duct is fastened to the S-duct with
R removable fasteners at FS 1705.0.

A diverter assembly, which is located below the fixed inlet assembly at WL 340.0, extends forward to FS 1705.0. The diverter is designed to improve air inlet characteristics by permitting stagnant boundary layer air to bypass the air inlet duct during flight. The diverter consists of skins and fairings stiffened with angles, longerons, and a nose rib.

R Skins and fairings cover the air inlet supporting structure and fair it into the fuselage afterbody. The S-duct directs air from the fixed inlet to the No. 2 engine. The S-duct, which is constructed of aluminum alloy, consists of three segments: forward, center, and aft.

Forward and center segments are joined with bolts into a one-piece section. The aft segment is joined to the forward section with a sealed slip joint interface.

Aft end of the S-duct is attached to a flexible fire seal which is attached to the canted bulkhead at approximately FS 2000.0.

Six removable cowl panels provide access to the No. 2 engine. Cowl panels provide a smooth aerodynamic fairing between the fuselage afterbody lower section and the engine thrust reverser.

Upper and lower cowl panels on the left and right sides of the engine are hinged and fastened with quick-opening latches.

Center cowl panels on both sides are fixed to provide a structural support between the fuselage afterbody and the engine firewall. Fixed center cowls also provide support for upper and lower hinged cowls. Fixed cowl panels are removable for engine installation.

Center engine support structure is located aft of the fuselage afterbody. Engine mounting provisions are located along the bottom of this structure.

Forward and aft engine mount attach fittings are located at FS 2053.8 and FS 2142.8.

Flush access doors are positioned along the sides of this structure: five on the left side and three on the right side.

Frames, formers, and skins forward of FS 2068.0 are made of aluminum alloy. Frames, formers, skins, and upper and lower ribs aft of FS 2068.0 are made of titanium. Fairings, aft and above the center engine support structure, are made of fiber glass.

C 2. Interim Repairs - Composites/Fiberglass

CR A. Deleted

C B. Aluminum tape (hi-speed tape) repairs are used to prevent
C moisture from entering damaged area and to prevent
C additional damage from air flow.

C C. Tape repairs should not be used for damage adjacent to any
C hinge attach points or for a total area greater than 10% of

C the component surface on one side (Ref. CP&P 1-51-1 for tape
C repair procedures).

C D. Metal repairs can be made to fairings using two aluminum
C patches (.032) bonded to fairing inner and outer skin with
C PR1422 and installed with bolts.

C E. Metal envelope repairs can be made to component trailing
C edges provided damage is limited to less than 25% of length
C and 10% of surface area (not to exceed three feet).

C F. Fiberglass repairs may be installed on any composite
C component.

C G. When installing interim repairs, good judgement is required
C when choosing the type of repair based on actual damage and
C location. If in doubt, contact Engineering for assistance.

C H. Interim repairs made using metal or fiberglass must be
C reinspected every 300 flights. Tape repairs must be
C rechecked each overnight layover.

C I. Notify MCIMD and MCIER of any interim or tape repairs
C installed and include in the message the applicable
C reinspection/check requirement (Ref. Step H.).

C 3. Metal Repairs Using Blind Rivets

C A. Cherry Max blind rivets can be used in all applications
C calling for the use of regular Cherry blind rivets.

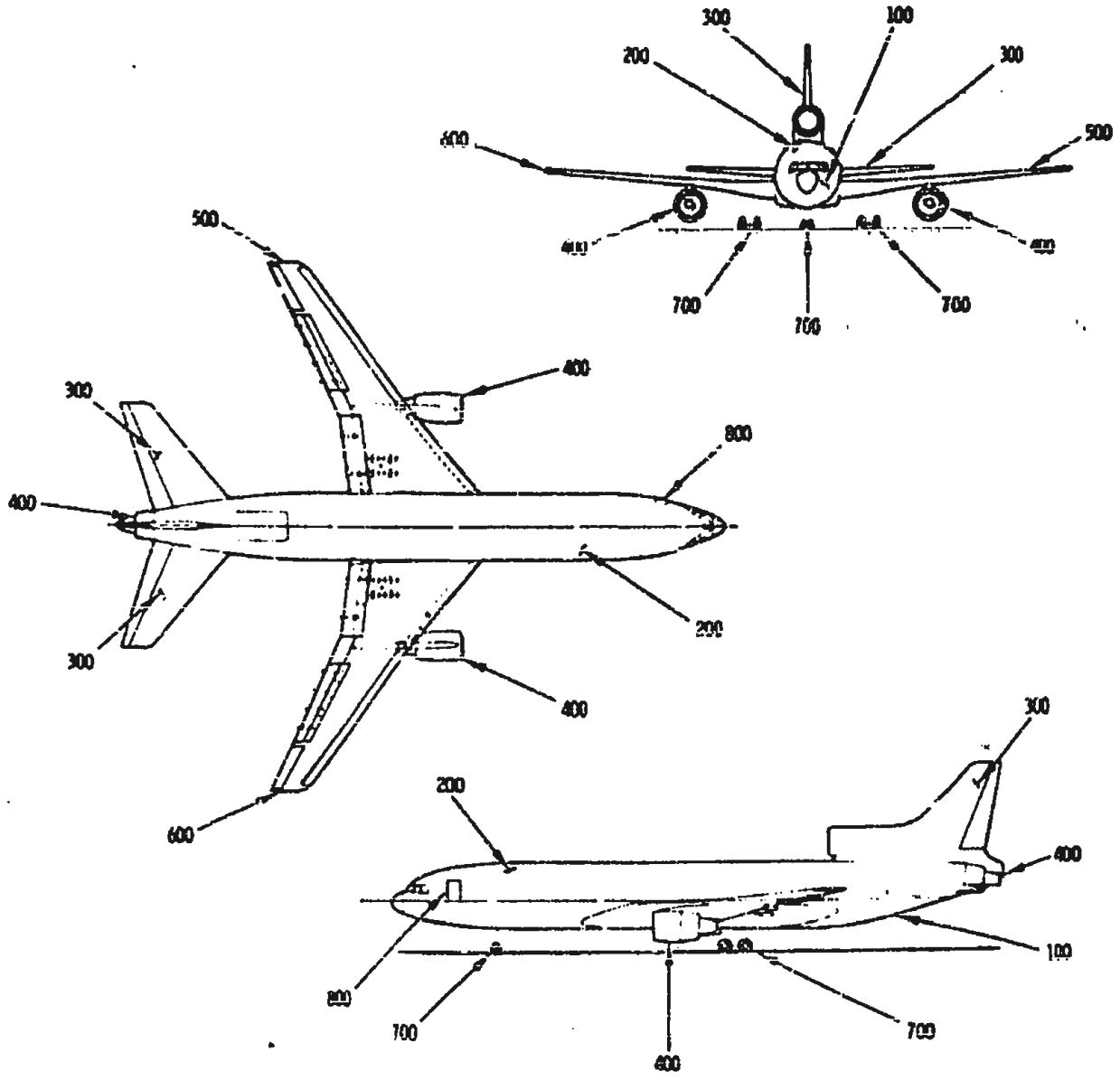
R ABNORMAL CABIN VIBRATIONS - FAULT ISOLATION

R 1. General

R Information included in this section refers to the integrity of
R all exterior access panels and doors located on the entire
R aircraft. A Component Locator is provided to illustrate the
R general location of these panels and doors. Refer to Chapter
R 6-40-00 for exact panel and door location.

R Access panels or doors which loosen or are lost in flight may
R create abnormal cabin vibrations. When detected by the flight
R crew, an entry is made into the aircraft flight log book and is
R reported to maintenance personnel by a FIRM fault code number.

R This number and the flight log book write up can be found in the
R Chapter 51 Fault Code Index.



INSPECTION AREAS - MAJOR ZONES

MAJOR ZONE 100 - LOWER PART OF FUSELAGE
MAJOR ZONE 200 - UPPER PART OF FUSELAGE
MAJOR ZONE 300 - AFTERBODY AND EMPENNAGE
MAJOR ZONE 400 - POWER PLANTS AND PYLONS
MAJOR ZONE 500 - WING, LEFT
MAJOR ZONE 600 - WING, RIGHT
MAJOR ZONE 700 - LANDING GEAR AND LG DOORS
MAJOR ZONE 800 - DOORS

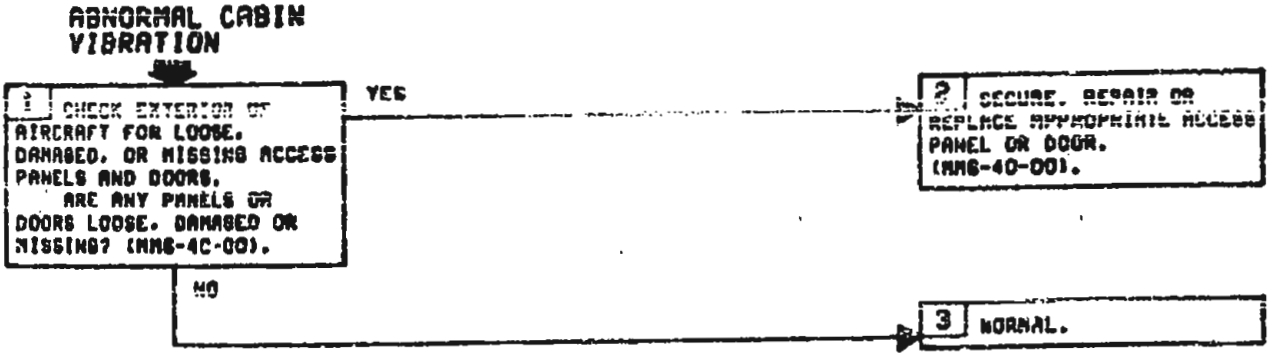
NOTE
EXACT PANEL AND DOOR LOCATIONS ARE FOUND IN MM 6-40-00

MI-0000-51-027

R Access Panel and Door Components Locator
R Figure 101

R EFFECTIVITY: ALL
R
001B

PREREQUISITES
NONE


ABNORMAL CABIN VIBRATION
1 CHECK EXTERIOR OF AIRCRAFT FOR LOOSE, DAMAGED, OR MISSING ACCESS PANELS AND DOORS. ARE ANY PANELS OR DOORS LOOSE, DAMAGED OR MISSING? (MM6-4C-00).
YES
2 SECURE, REPAIR OR REPLACE APPROPRIATE ACCESS PANEL OR DOOR. (MM6-40-00).
NO
3 NORMAL.

M1-0000-51-000

R Abnormal Cabin Vibration
R Figure 102

R EFFECTIVITY: ALL
R
001B

AIRFRAME DRAINAGE - DESCRIPTION AND OPERATION

1. General

Since liquid accumulation causes corrosion, and certain liquids are a fire hazard, drain holes must be inspected to make certain
R that openings are unrestricted, drain holes contain valves, and
R valves are operating properly. If a drain hole is clogged, a loop of soft wire may be inserted into the hole to unclog the hole. The drain valves can be readily removed for inspection and check (Ref. 57-01-01).

CAUTION: SCREWDRIVERS OR OTHER SHARP INSTRUMENTS MUST NOT BE INSERTED INTO DRAIN HOLES SINCE THEY COULD DAMAGE VALVES OR ENLARGE DRAIN HOLES.

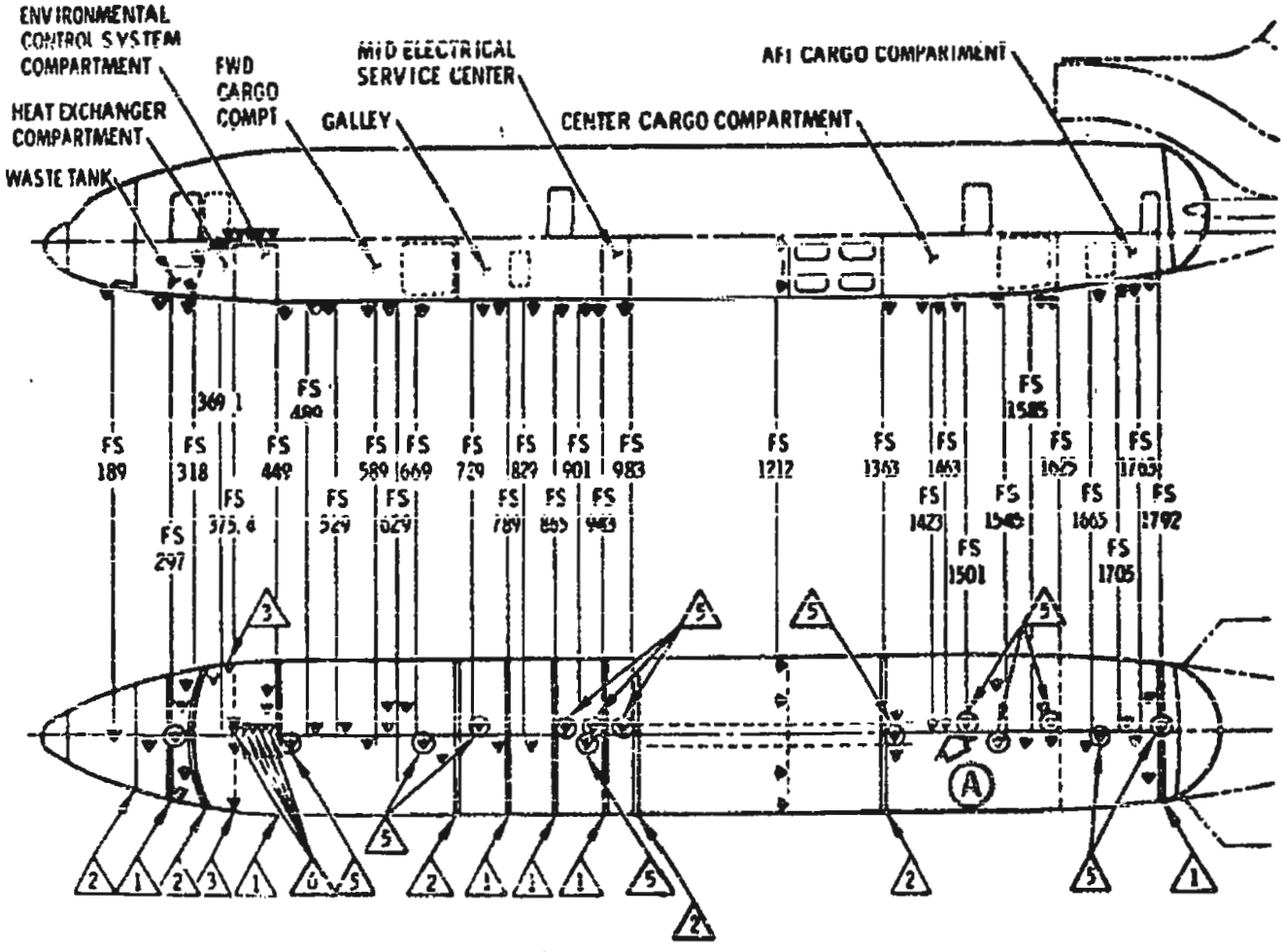
A. Fuselage Drains

Drainage of moisture and other liquids from the fuselage drain valves or open holes (Ref. Fig. 1) is performed by directing liquid flow to the bottom of the fuselage. In the lower fuselage, drainage is accomplished through natural means, such as stringer splice gaps, gaps formed by the intersection of structural members, and deep joggles or machined steps. These gaps must be free of sealant or other compounds. A series of 5/16-inch-diameter holes are located approximately 40 inches apart in the stringers. The holes are located tangentially with respect to the stringer flanges to avoid liquid entrapment. Insulation, which is self-supporting, stands away from the skin so that the flow of fluids is not impeded.

Spillage areas, such as the lavatories, galleys, cargo compartments, and service centers are isolated by dams. The stringer cutouts in the frame at FS 297 are sealed to provide an isolated waste tank compartment. The aft end of the compartment at FS 328 is canted and forms a natural dam. The forward lavatories, between FS 235 and FS 297, are over an isolated area bounded by the natural dam at FS 235 and the dam at FS 297. The galley compartment and the galley lift shaft are isolated. The frame at FS 703 (forward end of the galley) is a natural dam. The frame at FS 901 is sealed over the width of the lift shaft.

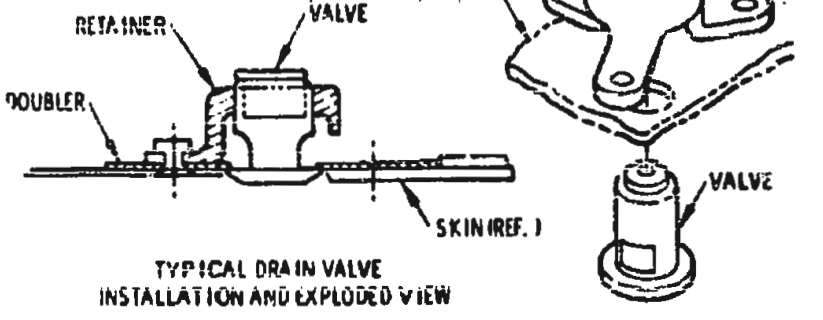
The frame at FS 943, which is sealed to form a dam at the aft end of the galley, also isolates the mid electrical service center, zone 137.

The frames at FS 789 and FS 865 (galley area) are sealed to limit fluid excursions to approximately 75-inch runs.



NOTE

1. INDICATES FABRICATED DAM
2. INDICATES NATURAL DAM
3. WITH SB53-095
- INDICATES VALVED DRAIN HOLE
- INDICATES OPEN HOLES WITH SCUPPERS
4. FOR INFORMATION ON PASSENGER AND CARGO COMPARTMENT DOOR DRAIN VALVES, REFER TO 53-15-00
5. INDICATES OPEN HOLES WITH SB53-192
6. INDICATES 5 VALVED DRAIN HOLES ADDED BY SB53-186



TYPICAL DRAIN VALVE INSTALLATION AND EXPLODED VIEW

M1-0000-51-023

R
R

Fuselage Drain Valves
Figure 1

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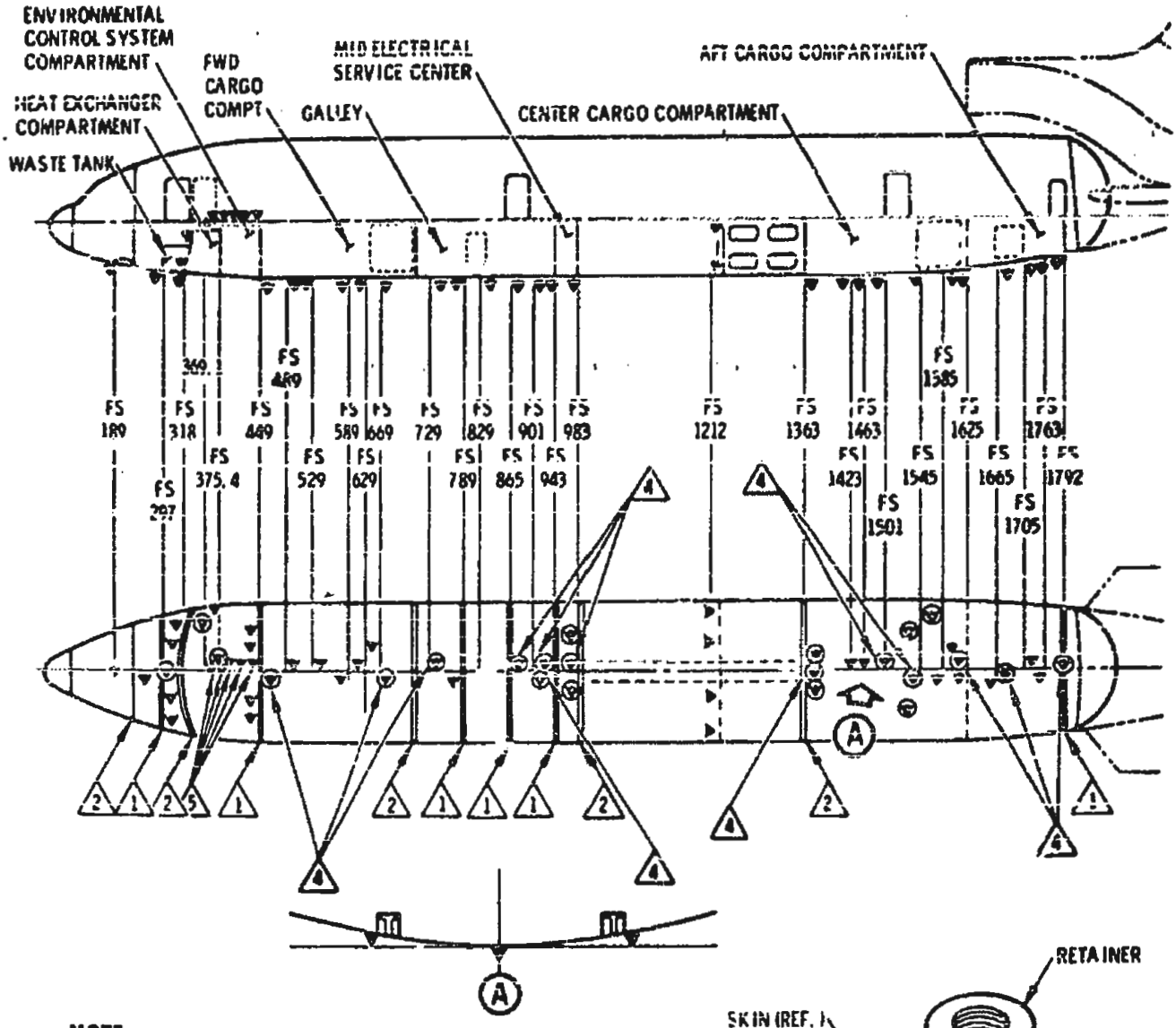
001B



NOTE

1. INDICATES FABRICATION DAM
2. INDICATES NATURAL DAM
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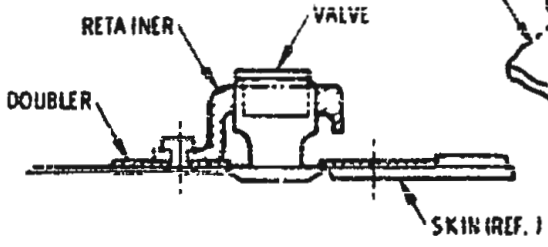
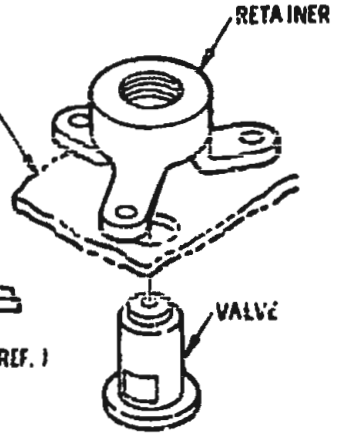
4. INDICATES OPEN HOLES WITH SCUPPERS
5. FOR INFORMATION ON PASSENGER AND CARGO COMPARTMENT DOOR DRAIN VALVES, REFER TO 53-15-00
6. INDICATES OPEN HOLES WITH S8053-192
7. INDICATES 5 VALVED DRAIN HOLES ADDED BY S8053-186



TYPICAL DRAIN VALVE INSTALLATION AND EXPLODED VIEW



MI-0000-51-025

R Fuselage Drain Valves
R Figure 1

A valve is located on each run. The aft cargo compartments are isolated by a natural dam at FS 1363 and by sealing the frame at FS 1792, which also isolates the aft waste tank compartment. The aft lavatories are located over this sealed area between FS 1792 and the pressure bulkhead.

R R R R R The drain valves are open and fluids are free to drain through valves when the aircraft is not pressurized. The drain valves can be removed from outside the aircraft. The drain valves are closed and fluids are retained when the aircraft is pressurized. The drain valves can be removed from outside the aircraft.

FUSELAGE DRAIN VALVES - INSPECTION AND CHECK

1. General

This procedure is applicable to the drain valves which are located along the lower fuselage to drain the various areas of the fuselage. For information on cargo compartment drainage, refer to 25-51-00. For information on passenger and cargo compartment door sill drainage, refer to 53-15-00.

These valves are normally open but close when the aircraft is pressurized. The location and function of the valves make them susceptible to clogging, because of collection of lint or other foreign material. To assure that valves, retainer area and drain tubes (where applicable) are free of foreign material, the valves should be removed, cleaned and inspected.

2. Equipment and Materials

Allen wrench - 5/16-inch diameter

Wire - Annealed and approximately 0.030 inch diameter

Cleaner - Federal Specification O-T-620, 1, 1, 1, Trichloroethane, or equivalent

Cloths, brushes, etc. as required

3. Inspection/Check

R A. Drain Valves

(1) Using 5/16-inch Allen wrench, unscrew drain valve from retainer. Reference Figure 601 for valve locations and typical installation.

NOTE: Tag and identify removed parts as required to assure correct location when installed.

CAUTION: IN THE PROCESS OF REMOVING FOREIGN MATERIAL AND CLEANING OF VALVE, DO NOT USE SHARP OBJECTS THAT MAY DAMAGE VALVE PLUNGER OR BODY.

(2) Remove all foreign material from valve using brush or any other suitable material or tool.

(3) Using flashlight, look through valve mounting hole to determine whether foreign material is around valve

retainer. Assure two drain tubes are open (Ref. Figure 601, View A).

(4) Using annealed wire, or equivalent, remove foreign material as required.

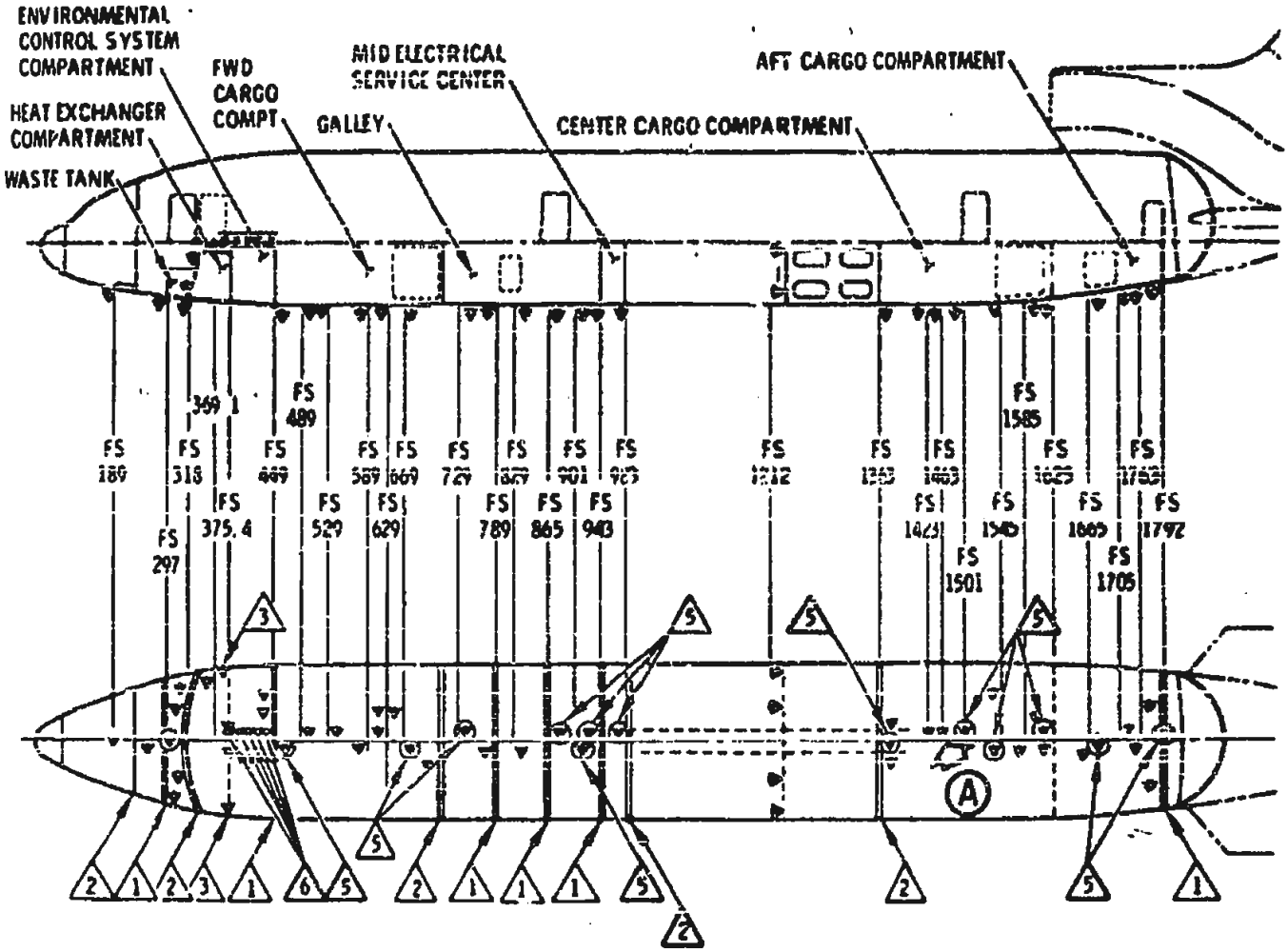
NOTE: If internal foreign material cannot be removed by working through valve mounting hole, floor boards or other access panels must be removed to gain access to valve retainer area.

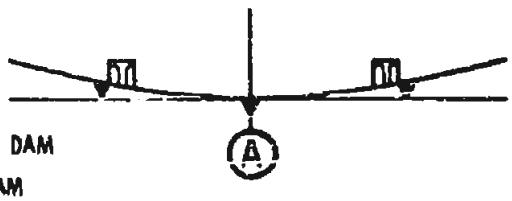
(5) Clean area around drain valves as required.

(6) Using cleaner, brush, cloth, or equivalent, clean valve.

(7) Inspect valve to assure that plunger is not ruptured or deteriorated and that plunger moves freely in valve housing. Replace valves as required.

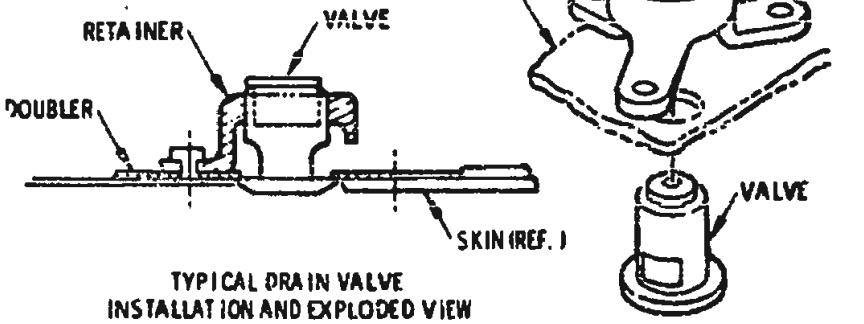
(8) Screw valve into retainer and tighten with 5/16-inch Allen wrench.





NOTE

1. INDICATES FABRICATED DAM
2. INDICATES NATURAL DAM
3. WITH SB53-095
- INDICATES VALVED DRAIN HOLE
- INDICATES OPEN HOLES WITH SCUPPERS
4. FOR INFORMATION ON PASSENGER AND CARGO COMPARTMENT DOOR DRAIN VALVES, REFER TO 53-15-00
5. INDICATES OPEN HOLES WITH SB53-192
6. INDICATES 5 VALVED DRAIN HOLES ADDED BY SB53-186

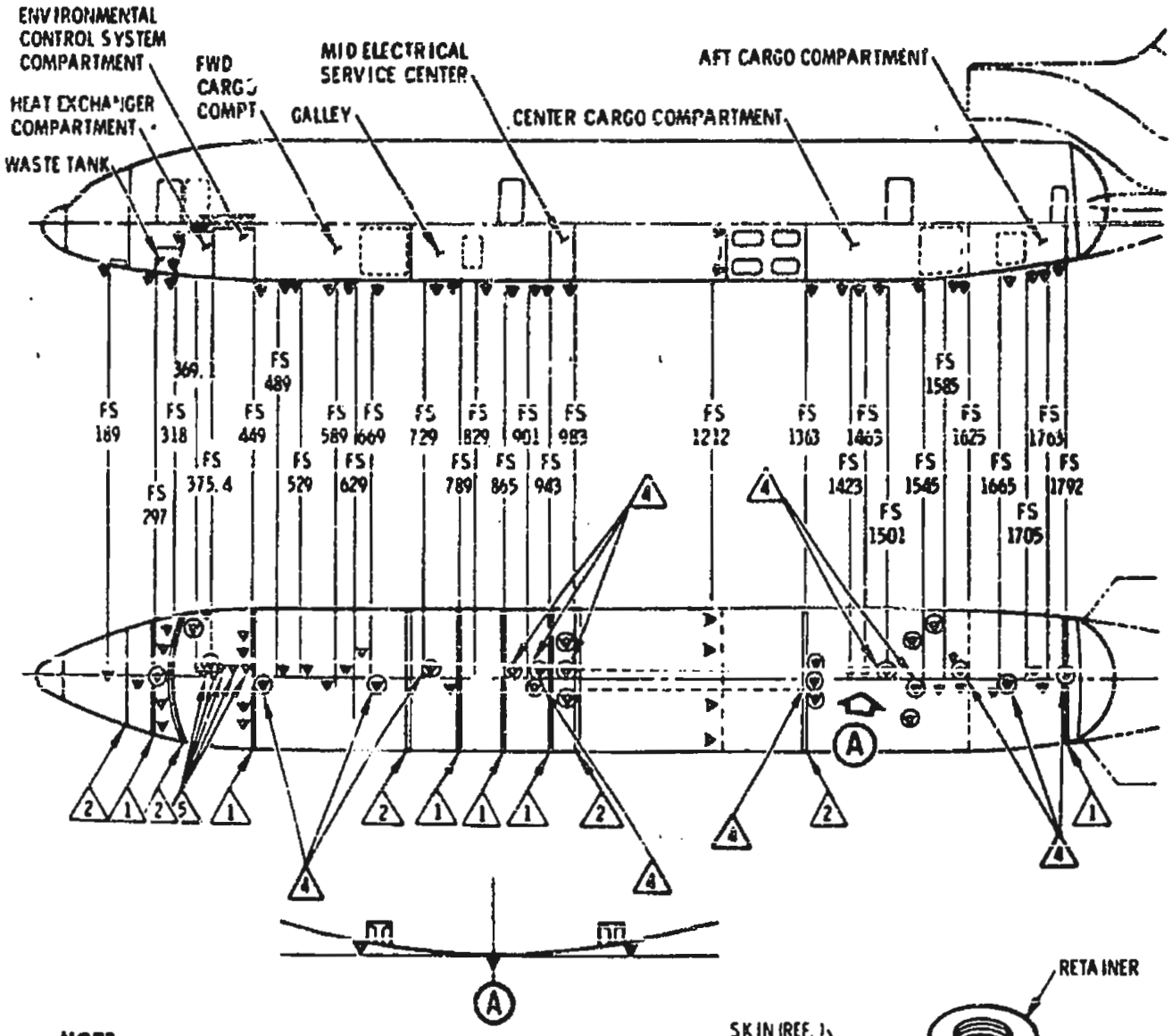


TYPICAL DRAIN VALVE INSTALLATION AND EXPLODED VIEW

M1-0000-51-023

R
R

Fuselage Drain Valves
Figure 601



NOTE

1. INDICATES FABRICATION DAM
2. INDICATES NATURAL DAM
3. INDICATES VALVED DRAIN HOLE
4. INDICATES OPEN HOLES WITH SCUPPERS
5. FOR INFORMATION ON PASSENGER AND CARGO COMPARTMENT DOOR DRAIN VALVES, REFER TO 53-15-00
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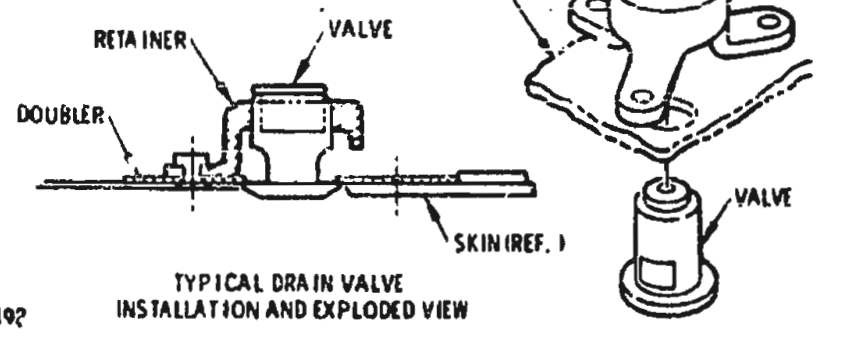


TYPICAL DRAIN VALVE INSTALLATION AND EXPLODED VIEW

M1-0000-51-025

R R Fuselage Drain Valves
Figure 601

FUSELAGE DRAIN VALVES CLEANING AND MAINTENANCE

1. General

This procedure is applicable to cleaning of drain valves which are located along the lower fuselage to drain the various areas of the fuselage.

To assure that valves, retainer area and drain tubes (where applicable) are free of foreign material, the valves should be removed, cleaned and inspected.

2. Equipment and Materials

LPS-3 - LPS Research Laboratories Inc., 2050 Cotner Ave., Los Angeles, Ca. 90025

Allen wrench - 5/16-inch diameter

Wire-annealed and approximately 0.030 inch diameter

Cleaner - Federal Specification O-T-620, 1, 1, 1, Trichloroethane, or equivalent

Cloths, brushes, etc as required.

3. Cleaning/Maintenance

(1) Using 5/16-inch Allen wrench, unscrew drain valve from retainer. Reference Figure 701 for valve locations and typical installation.

CAUTION: IN THE PROCESS OF REMOVING FOREIGN MATERIAL AND CLEANING OF VALVE, DO NOT USE SHARP OBJECTS THAT MAY DAMAGE VALVE BODY OR PLUNGER.

(2) Remove all foreign material from valve using brush or any other suitable material or tool.

(3) Using flashlight, look through valve mounting hole to determine whether foreign material is around valve retainer. Assure two drain tubes are open (Ref. Figure 701, View A).

(4) Using annealed wire, or equivalent, remove foreign material as required.

NOTE: If internal foreign material cannot be removed by working through valve mounting hole, floor boards or other access panels must be removed to gain access to valve retainer area.

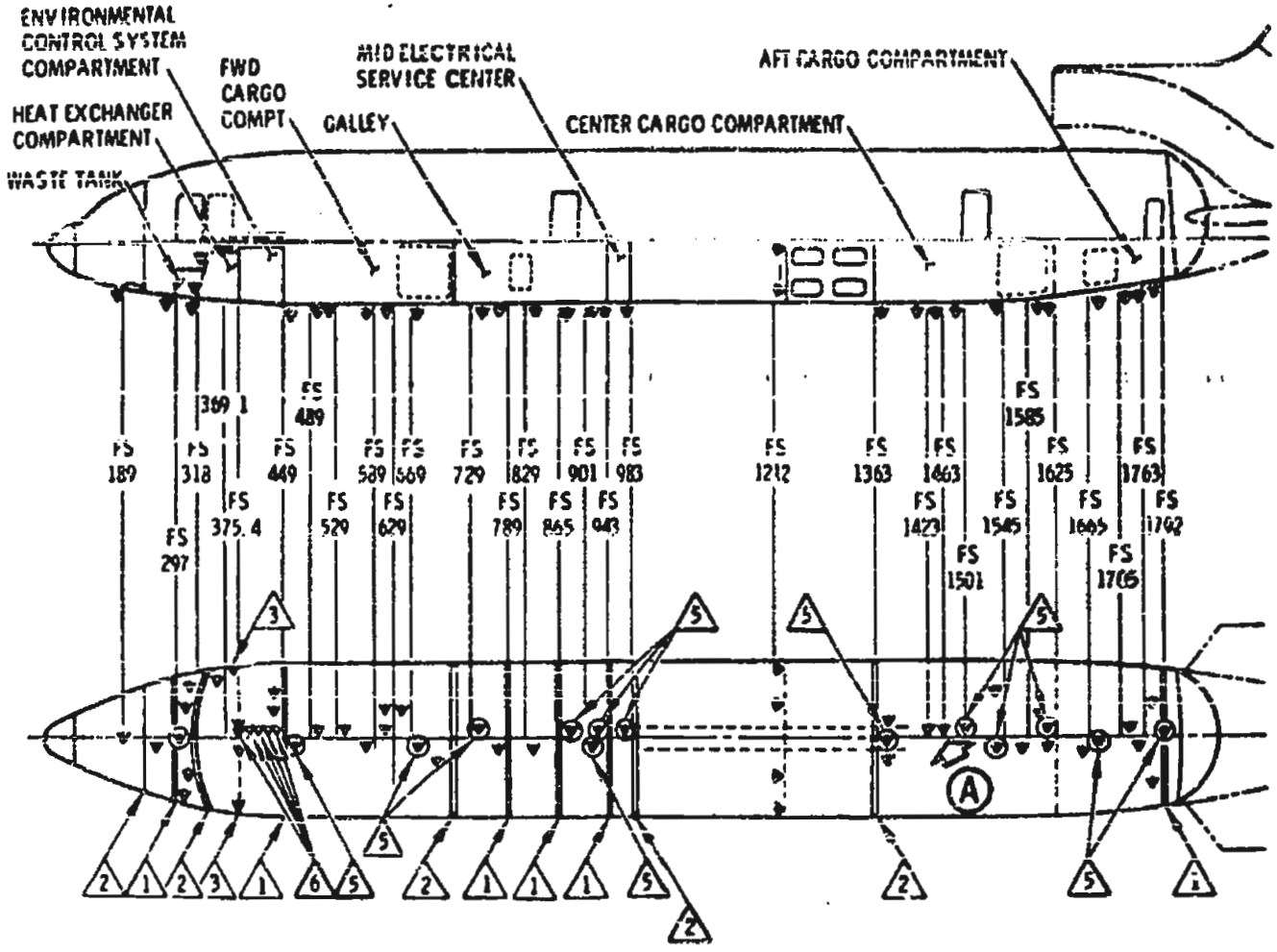
(5) Clean area around drain valves as required.

(6) Using cleaner, brush, cloth, or equivalent, clean valve.

(7) Inspect valve to assure that plunger is not ruptured or deteriorated and that plunger moves freely in valve housing. Replace valves as required.

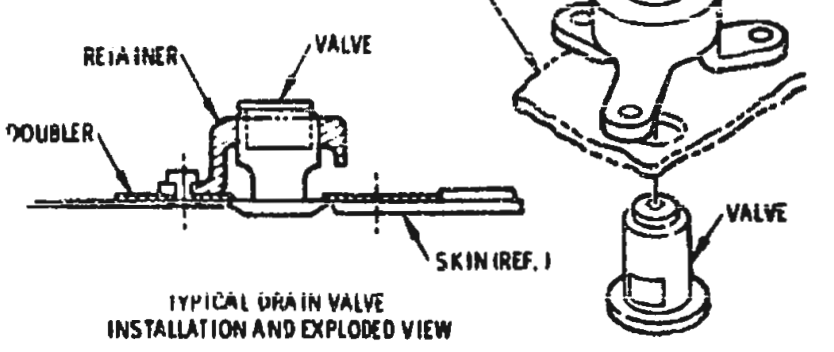
(8) Screw valve into retainer and tighten with 5/16-inch Allen wrench.

(9) After all drain passages have been cleaned, coat entire area with LPS-3.



NOTE

1. INDICATES FABRICATED DAM
2. INDICATES NATURAL DAM
3. WITH SB53-095
- INDICATES VALVED DRAIN HOLE
- INDICATES OPEN HOLES WITH SCUPPERS
4. FOR INFORMATION ON PASSENGER AND CARGO COMPARTMENT DOOR DRAIN VALVES, REFER TO 53-15-00
5. INDICATES OPEN HOLES WITH SB53-192
6. INDICATES 5 VALVED DRAIN HOLES ADDED BY SB53-186



TYPICAL DRAIN VALVE INSTALLATION AND EXPLODED VIEW

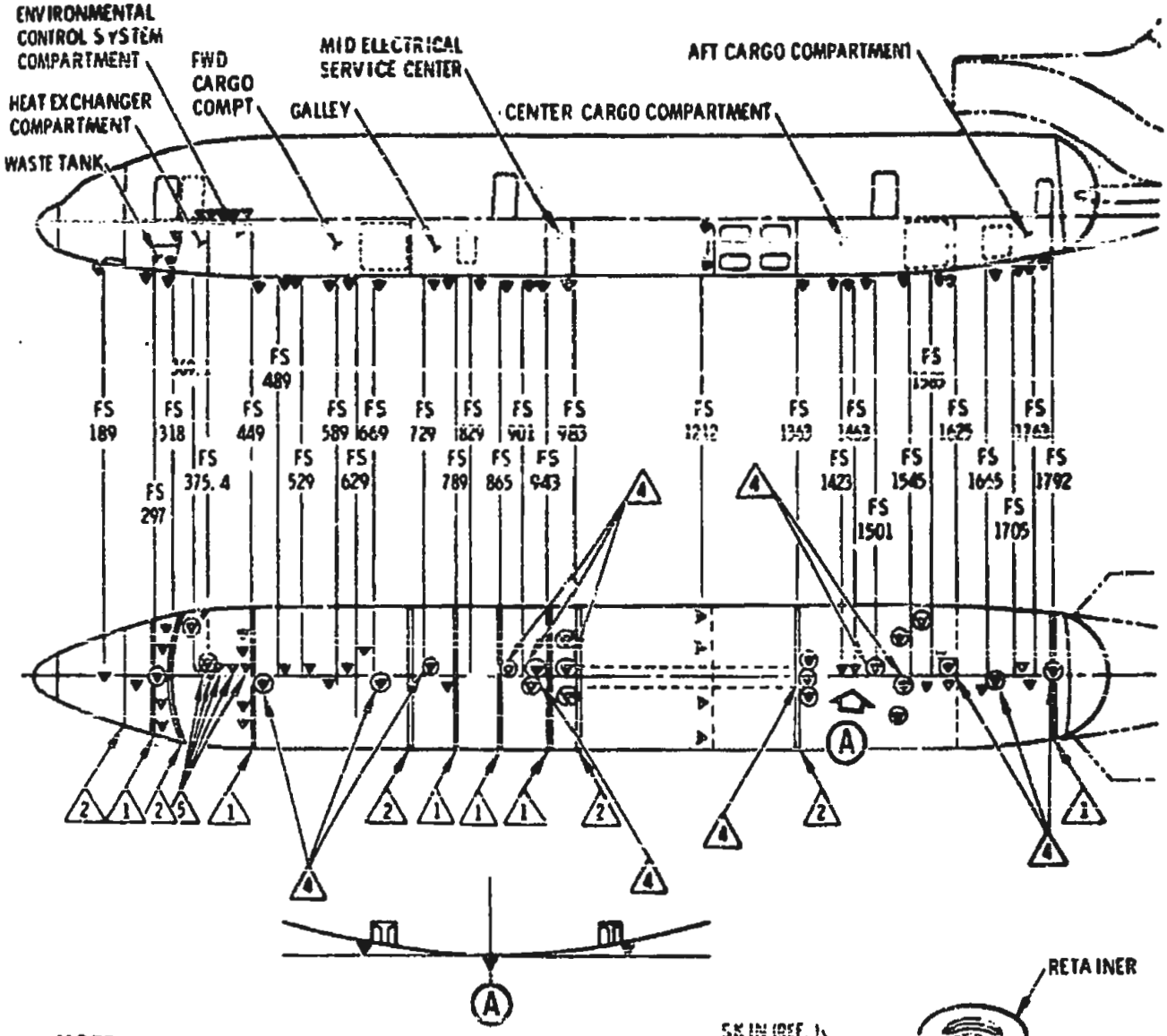
MI-0000-51-023

R
R

Fuselage Drain Valves
Figure 701

EFFECTIVITY: 001-031

0018



NOTE

1. INDICATES FABRICATION DAM
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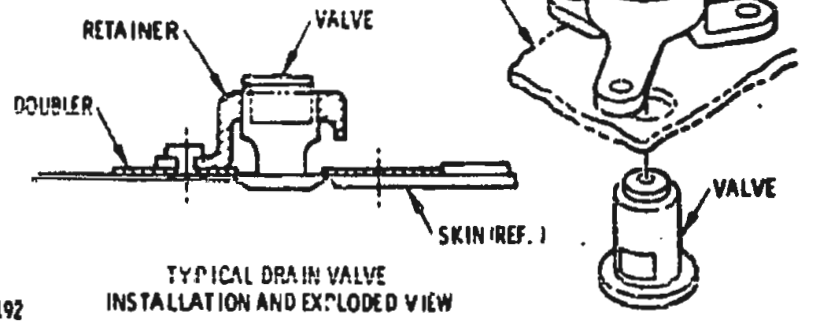
3. INDICATES VALVED DRAIN HOLE
4. INDICATES OPEN HOLES WITH SCUPPERS
5. FOR INFORMATION ON PASSENGER AND CARGO COMPARTMENT DOOR DRAIN VALVES, REFER TO 53-15-00
6. INDICATES OPEN HOLES WITH SB053-192
7. INDICATES 5 VALVED, DRAIN HOLES ADDED BY S3053-186



TYPICAL DRAIN VALVE INSTALLATION AND EXPLODED VIEW

M1-0000-51-025

R
R

Fuselage Drain Valves
Figure 701

PAINTING EXTERIOR SURFACES - CLEANING AND PAINTING

1. Equipment and Materials

Paint spray equipment, Devilbiss Model PMB spray gun with FX needle and nozzle, and No. 765 air cap, or equivalent

Primers and topcoat; the following or equivalent:

Wash primer: Sterling Lacquer Mfg. Co., No. M-3225

Polyurethane intermediate primer: Sterling Lacquer Mfg. Co., No. U-1000

Polyurethane enamel topcoat: Sterling Lacquer Mfg. Co., No. U-series (select applicable number for desired color)

Abrasive paper, wet or dry 320 and 400 grit or finer

Kraft paper

Solvent, methyl-ethyl-ketone (MEK), Fed Spec TT-M-261, or equivalent

Cleaner, Aliphatic Naptha, Fed Spec TT-N-958, Type II, or equivalent

Tack cloth

Cotton cloth (lint-free)

Film thickness measuring equipment, Fischer Permascope, or equivalent (Ref. Step 3B)

R 2. Cleaning/Painting

A. Prepainting Procedure

R (1) Strip paint as required.

R (2) Remove corrosion and treat affected area as required.

R (3) Clean areas to be painted.

B. Measurement of Dry Film Thickness

(1) If a Permascope, or equivalent, film thickness measuring equipment is unavailable, perform Steps (2) through (4).

(2) Attach a clean, smooth aluminum test coupon (whose thickness has been measured) with masking tape to edge of airplane surface to be sprayed with primer or topcoat.

(3) Apply typical coat of primer or topcoat over aircraft surface and aluminum test coupon.

(4) After application dries, remeasure aluminum test coupon for film thickness with micrometer to determine compliance with applicable dry film thickness requirements [Step C(1), D(1), or E(1)].

WARNING: ALL PRIMERS, SOLVENT, AND TOPCOAT ARE FLAMMABLE AND TOXIC. DO NOT EXPOSE SUCH MATERIALS TO ANY IGNITION SOURCE. USE FULL-FACE RESPIRATOR, OR EQUIVALENT, AND PROTECTIVE CLOTHING. USE SOAP AND WATER TO WASH SKIN CONTAMINATED BY ANY SOLVENT, PRIMER, OR TOPCOAT, AND SEEK IMMEDIATE MEDICAL AID.

CAUTION: MIX PRIMERS AND TOPCOAT AS SPECIFIED BY THE MANUFACTURER, AND STAMP THE EXPIRATION DATE OF MIXED PRIMER OR TOPCOAT ON EACH CONTAINER. DO NOT USE ANY PRIMER OR TOPCOAT BEYOND THE EXPIRATION DATE.

SPRAY EQUIPMENT MUST BE CLEANED WITH SOLVENT BEFORE AND AFTER USING ANY PRIMER OR TOPCOAT.

DO NOT APPLY WASH PRIMER ON FIBER GLASS.

C. Wash Primer Application

(1) Spray wash primer as a wet film on surface to be painted. Dry film thickness must be 0.3 to 0.4 mil (Step B).

(2) Allow wash primer to dry a minmum of 30 minutes to a maximum of 8 hours at 75 (±10) degre F.

(3) Dry wash primer may be rubbed lightly with Kraft paper to remove any roughness. Remove runs or sags by sanding lightly with dry 320-grit or finer abrasive paper.

(4) Remove sanding residue with tack cloth and wipe sanded area with cleaner-dampened cotton cloth.

R CAUTION: INTERMEDIATE PRIMER MUST BE APPLIED OVER DRY WASH PRIMER WITHIN A PERIOD NOT TO EXCEED 8 HOURS [STEP C(2)]. IF THE TIME IS EXCEEDED, REMOVE WASH PRIMER BY STRIPPING OR USE CLOTH DAMPENED WITH SOLVENT, AND REPEAT STEPS C(1) AND C(2), AND IF NECESSARY STEPS C(3) AND C(4).

D. Intermediate Primer Application

(1) Spray intermediate primer on dry wash primer surface. Dry film thickness must be 0.5 to 0.8 mil (Step B).

(2) Allow intermediate primer to dry a minimum of 90 minutes to a maximum of 24 hours at 75 (±10) degrees F. However, if the entire dry intermediate primer surface is sanded [Step D(3)], the maximum time limit before the topcoat must be applied may be extended to 96 hours.

(3) Dry intermediate primer may be rubbed lightly with Kraft paper to remove any roughness. Remove runs or sags by sanding lightly with dry 320-grit or finer abrasive paper.

(4) Remove sanding residue with tack cloth, and wipe sanded area with cleaner-dampened cotton cloth.

E. Enamel Topcoat Application

(1) Spray topcoat on dry intermediate primer surface. Dry film thickness must be 1.5 to 2.0 mils (Step B).

(2) Allow topcoat to dry a minimum of 24 hours to a maximum of 168 hours at 75 (±10) degrees F.

(3) Remove runs or sags by sanding lightly with wet or dry 400-grit or finer abrasive paper.

(4) Remove sanding residue with tack cloth, and wipe sanded area with cleaner-dampened cotton cloth.

(5) Touch up sanded area with topcoat and allow to dry [Step E(2)].

FUSELAGE DRAINS - DESCRIPTION AND OPERATION

1. General

There are five externally mounted airfoil-shaped drain masts located on the lower part of the fuselage (Ref. Fig. 1 and 06-10-00, Fig. 8). These masts are connected by plumbing lines to system units or to areas which require a means of overboard drainage. The various masts are identified and described as follows.

A. Waste Water Heated Drain Mast

There are two of these heated drain masts located at FS 846, LBL 11.94 and FS 1792, RBL 30.3. For further information on these drain masts refer to 38-32-00, 30-71-00 and 30-71-10.

B. Keelson Drain Mast and Drain Manifold

The keelson drain mast and drain manifold are located at FS 1358, RBL 38 and provides drainage for the wing center section, hydraulic system components located in the hydraulic service center, forward shroud of the No. 2 engine fuel supply system and for fluids that may collect in the hydraulic service center area (Ref. Fig. 1). The drain mast is attached to the fuselage and drain manifold with four bolts and can be removed and installed from outside the aircraft. The four plate nuts are attached to the mounting lugs of the drain manifold. The drain manifold has nine threaded openings, eight of which are used for attachment of terminating tube assemblies which drain either system components or areas. The ninth opening (aft) is either capped or has a milled slot for free-flow drainage of fluids which may collect in the hydraulic service center area.

The drain mast is approximately 12 inches long and has three separate drain passages that extend the length of the mast. These drain passages align with the three drain openings in the drain manifold. A packing and two seals provide interface sealing between the drain mast and the drain manifold. A sealant is used around the periphery of the drain mast base plate to seal against entrance of water.

C. Afterbody Drain Mast

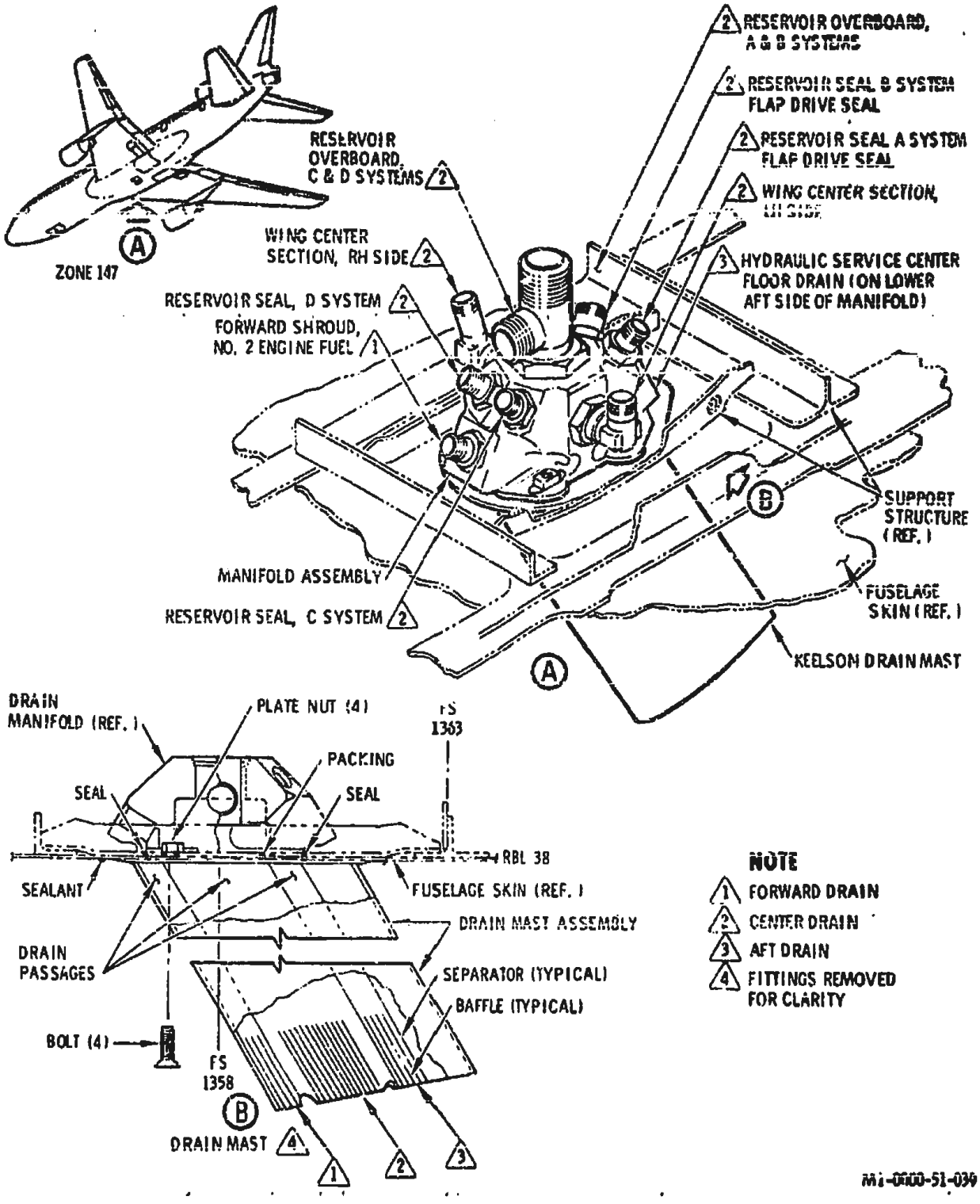
The afterbody drain mast is located at FS 1685, LBL 35.28 and provides drainage for fluids which collect in the area aft of the aft pressure bulkhead in the fuselage afterbody. The drain mast is attached to the fuselage support structure R with bolts and plate nuts (Ref. Fig. 2). The mast has a

drain tube assembly which is held rigid by plastic urethane foam which fills the core of the mast. The upper end of the mast drain tube has a sleeve and nut which connects with plumbing lines that begin at the bottom of the aft pressure bulkhead frame fitting (FS 1815 and between stringers 32 and 33) and extends forward and downward to the drain mast. A sealant is applied between the mast base plate and the fuselage skin. Removal and installation of the afterbody drain mast cannot be accomplished from outside the aircraft because of the internal tubing connection.

D. APU Compartment Drain Mast

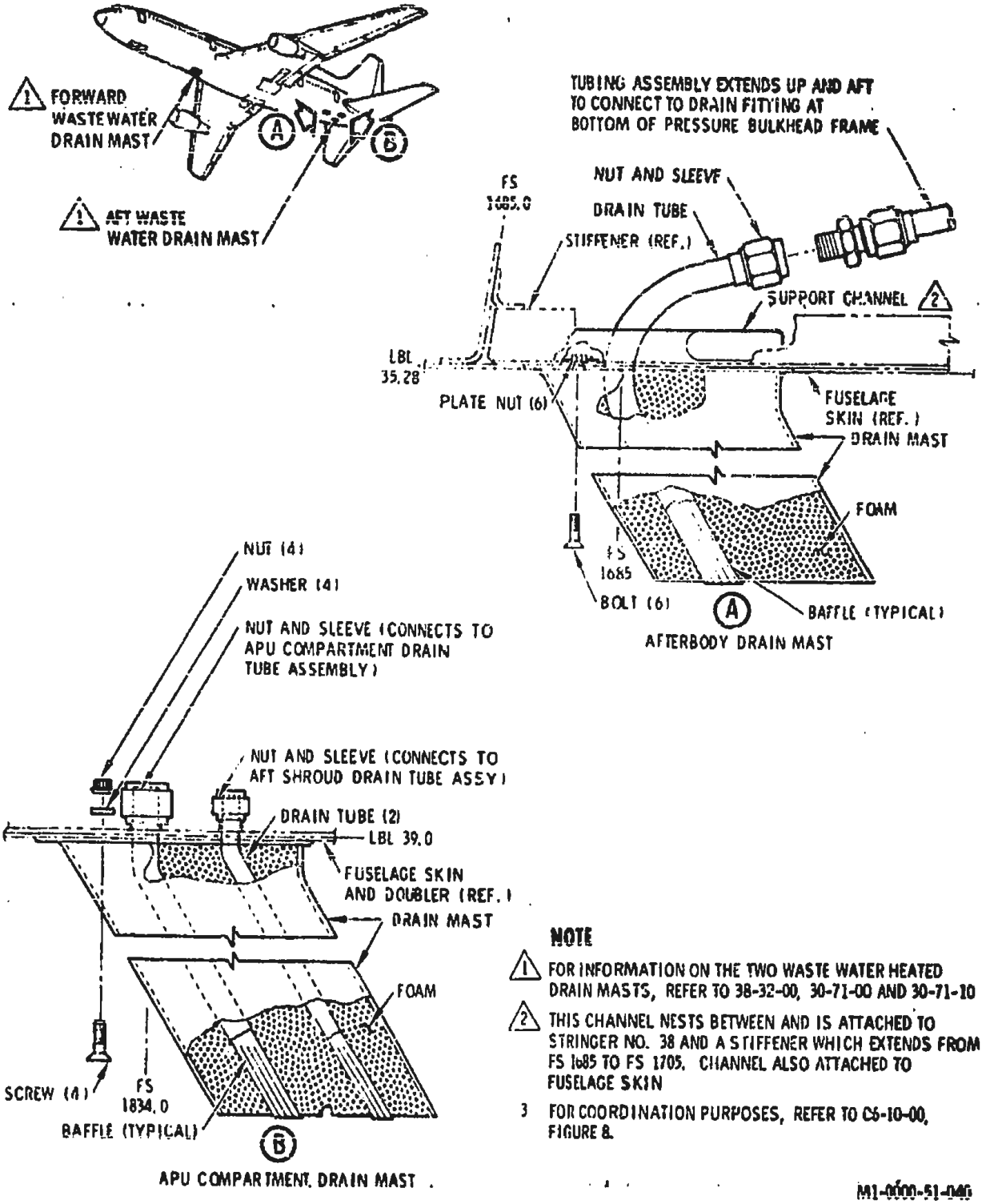
R The APU compartment drain mast (Ref. Fig. 2) is located on the lower left side of the fuselage slightly aft of the aft pressure bulkhead at FS 1834, LBL 39. The mast has two separate drain tubes and provides drainage for the APU compartment area and aft shroud of the No. 2 engine fuel supply system. Individual drain tubing installations connect the respective areas to be drained to the proper tube in the drain mast (Ref. Fig. 1). The collection and drainage point for fluids from the APU compartment area is located at FS 1885, LBL 2.25. The drainage point for the fuel line aft shroud is from the shroud assembly located immediately aft of the aft pressure bulkhead FS 1860, WL 196 and immediately left of BL 0.0.

The drain mast is attached to the fuselage support structure with four screws and self-locking nuts. The internal tube assemblies connect directly to the mast drain tubes. A sealant is used between the drain mast base plate and the fuselage skin to seal against the entrance of water. Removal and installation of the drain mast cannot be accomplished from outside the aircraft because of the internal tubing connections and noncaptivate-type nuts used with the mast attachment screws.



R Keelson Drain Mast
R Figure 1

R EFFECTIVITY: ALL
R
001B



NOTE

1. FOR INFORMATION ON THE TWO WASTE WATER HEATED DRAIN MASTS, REFER TO 38-32-00, 30-71-00 AND 30-71-10
2. THIS CHANNEL NESTS BETWEEN AND IS ATTACHED TO STRINGER NO. 38 AND A STIFFENER WHICH EXTENDS FROM FS 1685 TO FS 1705. CHANNEL ALSO ATTACHED TO FUSELAGE SKIN
3. FOR COORDINATION PURPOSES, REFER TO C6-10-00, FIGURE 8.

M1-0000-51-040

R R Fuselage Drain Masts
Figure 2

R EFFECTIVITY: ALL

001B

KEELSON DRAIN MAST - REMOVAL AND INSTALLATION

1. General

The keelson drain mast is removed and installed from outside the aircraft.

2. Equipment and Materials

Petrolatum - Specification VV-P-236 or equivalent

Sealing Compound - PR 1436G, Class B (Products Research Corp), or equivalent

Scraping Block - Fabricate from Micarta, Plastic or similar material

3. Referenced Procedures

	20-51-04	Environmental Sealing of Model L-1011 Airplane
R R	20-24-04	Electrical Bonding and Grounding - Maintenance Practices

4. Removal/Installation

A. Removal

(1) Remove sealant from around base plate of drain mast, using scraping block or equivalent.

(2) Remove four attachment bolts and retain for reuse (Ref. Fig. 401).

(3) Remove drain mast.

(4) Remove packing and seals. Retain for reuse, if condition is satisfactory.

B. Installation

(1) Remove any sealant residue from base plate area.

(2) Clean skin and base plate (Ref. 20-51-04).

R R (3) Electric bond faying surface of mast base plate (Ref. 20-24-04).

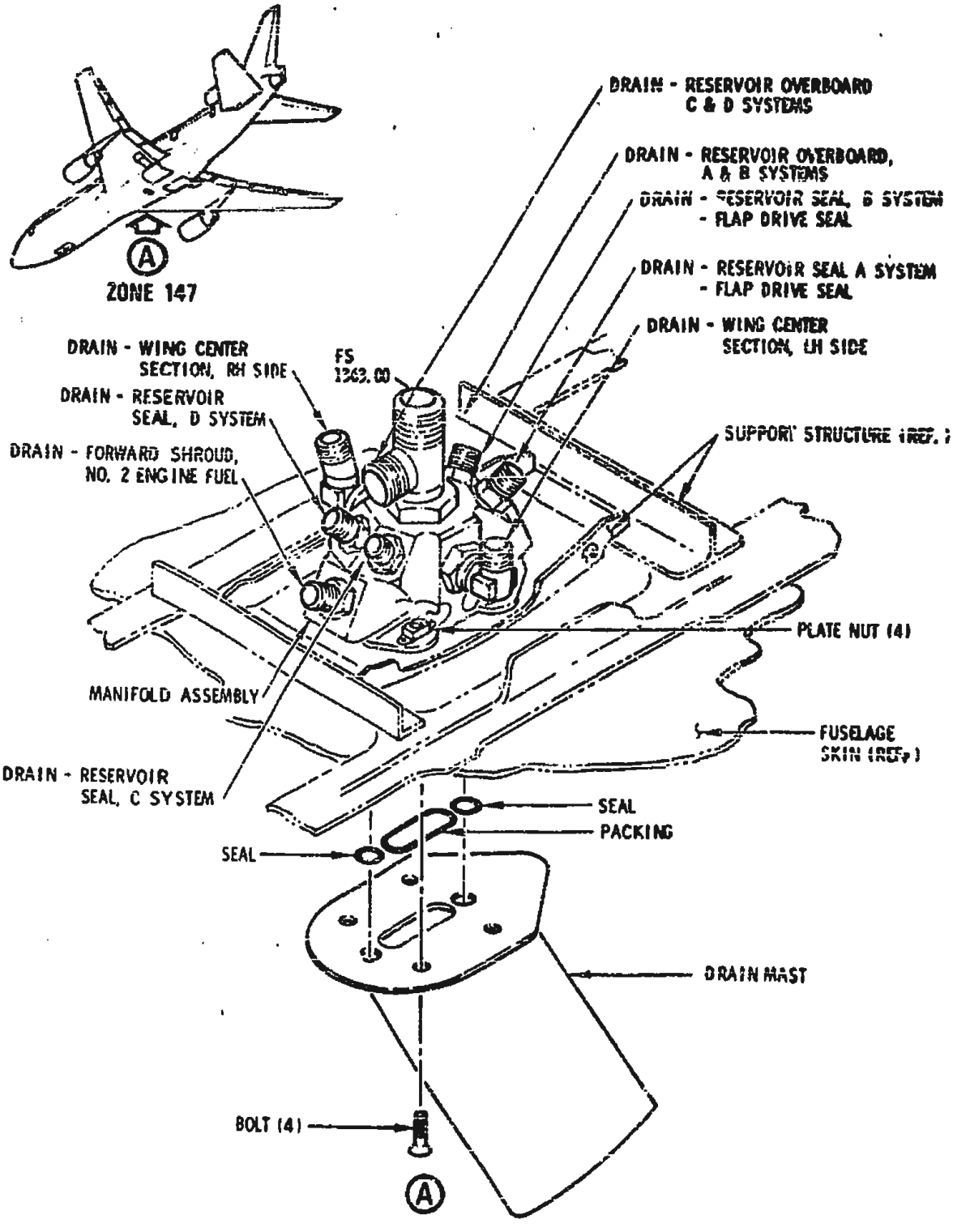
R (4) Lubricate packing and seals with Petrolatum and install in respective positions in drain manifold.

R (5) Place drain mast in position and align mounting holes with holes in manifold. Assure that packing and seals are in position.

R (6) While supporting drain mast, install four attachment bolts.

R (7) Check bonding resistance between mast to keelson skin.
R Electrical resistance must not exceed 0.0025 ohms.

R (8) Apply fillet of sealant around periphery of mast base
R plate (Ref. 20-51-04).


ZONE 147
DRAIN - RESERVOIR OVERBOARD C & D SYSTEMS
DRAIN - RESERVOIR OVERBOARD, A & B SYSTEMS
DRAIN - RESERVOIR SEAL, B SYSTEM - FLAP DRIVE SEAL
DRAIN - RESERVOIR SEAL A SYSTEM - FLAP DRIVE SEAL
DRAIN - WING CENTER SECTION, LH SIDE
DRAIN - WING CENTER SECTION, RH SIDE
FS 1262.00
DRAIN - RESERVOIR SEAL, D SYSTEM
DRAIN - FORWARD SHROUD, NO. 2 ENGINE FUEL
SUPPORT STRUCTURE (REF.)
PLATE NUT (4)
MANIFOLD ASSEMBLY
FUSELAGE SKIN (REF.)
DRAIN - RESERVOIR SEAL, C SYSTEM
SEAL
PACKING
SEAL
DRAIN MAST
BOLT (4)
A

M1-0002-51-009

R
R

Keelson Drain Mast - Removal and Installation
Figure 401

KEELSON DRAIN MANIFOLD - REMOVAL AND INSTALLATION

1. General

The Keelson drain manifold is located below the floor of the hydraulic service center (aft right corner) at FS 1358 and RBL 38. The various drain lines connect to plumbing fittings which screw directly into the body of the manifold. Access to the manifold is through the hydraulic service center aft access door 1478B.

2. Referenced Procedures

	51-10-01	Keelson Drain Mast - Removal and Installation
R R	20-24-04	Electrical Bonding and Grounding - Maintenance Practices

3. Removal/Installation

A. Removal

(1) Open hydraulic service center aft access door 1478B.

(2) At drain manifold, disconnect all drain lines (9) from manifold fittings (Ref. Fig. 401). Identify tube locations as required.

(3) Remove Keelson drain mast (Ref. 51-10-01).

(4) Remove drain manifold.

B. Installation

(1) Clean drain manifold as required and assure that all passages are clean and clear of any foreign matter.

(2) Clean area around drain manifold mounting position as required.

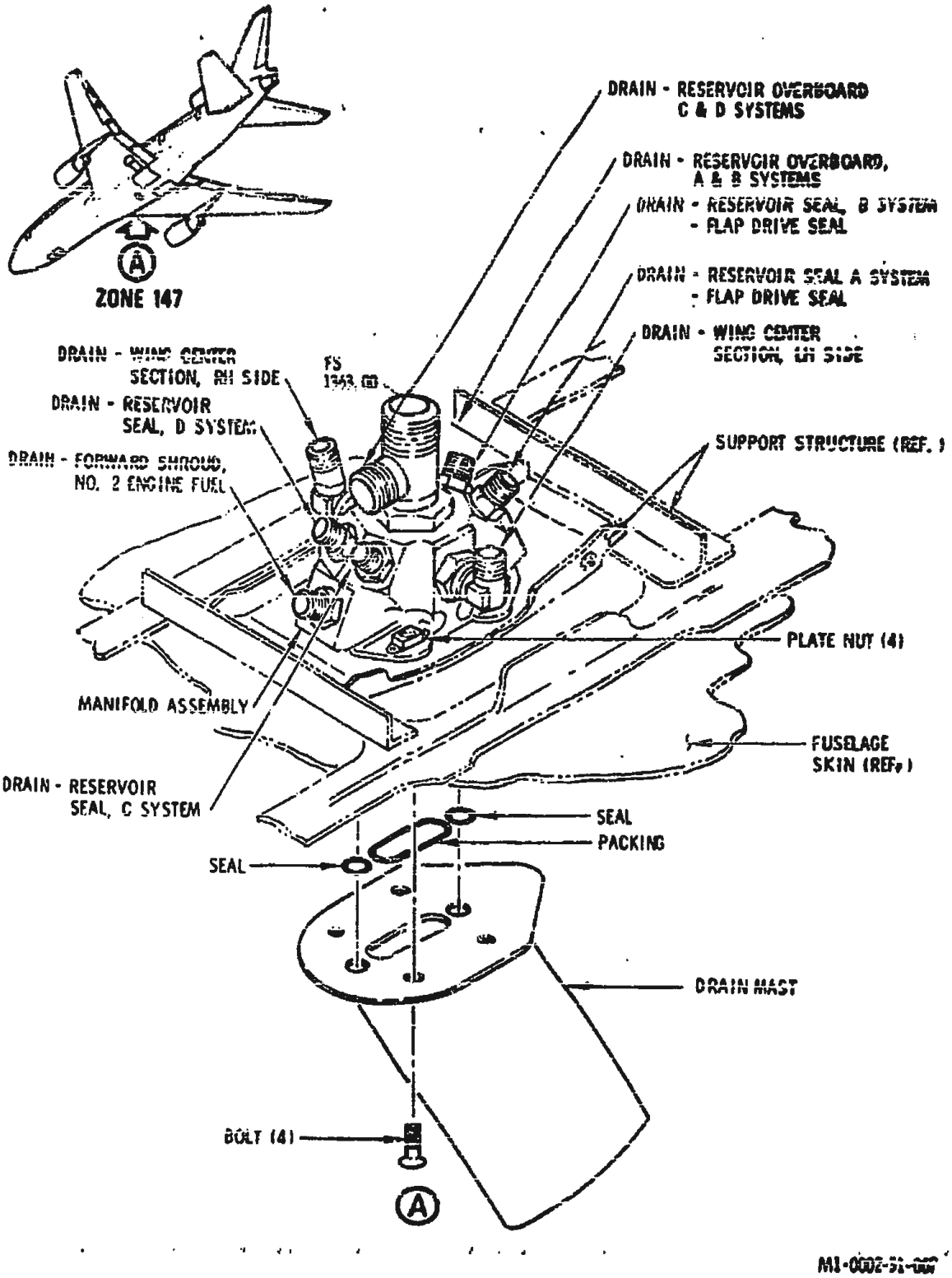
R R R (3) Electrical bond of faying surface of seal boss on manifold to base plate of mast and mounting flanges of manifold (Ref. 20-24-04).

R (4) Place drain manifold in position at mounting location.

R (5) While holding drain manifold in position, install Keelson drain mast (Ref. 51-10-01).

R (6) Attach all drain lines to the appropriate drain
R manifold fitting.

R (7) Close hydraulic service center aft access door 1478B.


ZONE 147
DRAIN - RESERVOIR OVERBOARD C & D SYSTEMS
DRAIN - RESERVOIR OVERBOARD, A & B SYSTEMS
DRAIN - RESERVOIR SEAL, B SYSTEM - FLAP DRIVE SEAL
DRAIN - RESERVOIR SEAL A SYSTEM - FLAP DRIVE SEAL
DRAIN - WING CENTER SECTION, LH SIDE
DRAIN - WING CENTER SECTION, RH SIDE
FS 1343.00
DRAIN - RESERVOIR SEAL, D SYSTEM
DRAIN - FORWARD SHROUD, NO. 2 ENGINE FUEL
SUPPORT STRUCTURE (REF.)
PLATE NUT (4)
MANIFOLD ASSEMBLY
FUSELAGE SKIN (REF.)
DRAIN - RESERVOIR SEAL, C SYSTEM
SEAL
PACKING
SEAL
DRAIN MAST
BOLT (4)
A

M1-0002-51-000

R Keelson Drain Manifold - Removal and Installation
R Figure 401

R EFFECTIVITY: ALL
R
0018

R AFTERBODY DRAIN MAST - REMOVAL AND INSTALLATION

R 1. General

R The afterbody drain mast is located at FS 1685, LBL 35.28.
R Access to the internal tubing connection is gained by removing
R floor panel 166HT in the aft cargo compartment. The mast
R attachment bolts are accessible from outside the aircraft.

R 2. Equipment and Materials

R Sealing Compound - PR 1422A-2 (Products Research Corp), or
R equivalent

R Cleaner - Federal Specification O-T-620; 1, 1, 1,
R Trichloroethane, or equivalent

R 3. Referenced Procedures

R 6-50-00 Interior Panels, Zone 166, Aft Cargo Compartment
R Floor

R 20-51-04 Environmental Sealing of Model L-1011 Airplane

R 53-24-01 Cargo Compartment Floor Panels - Removal and
R Installation

R 4. Removal/Installation

R A. Removal

R (1) Open aft cargo compartment door.

R (2) Remove aft cargo compartment floor panel 166HT (Ref.
R 6-50-00 and 53-24-01).

R (3) Disconnect mast drain tube nut from drain tube assembly
R (Ref. Fig. 401).

R (4) Remove drain mast attachment bolts (6) and retain for
R reuse.

R CAUTION: USE CARE IN BREAKING SEAL BETWEEN MAST
R BASEPLATE AND FUSELAGE SKIN TO PREVENT DAMAGE
R TO THE SURFACES.

R (5) Remove drain mast from aircraft.

R B. Installation

R (1) Remove all sealing compound from mast baseplate and
R fuselage skin, using cloth dampened with cleaner.
R Assure that mast drain tube is open and free of foreign
R material.

R (2) Apply thin layer of sealing compound, with brush, to
R mating surfaces of skin and baseplate (Ref. 20-51-04).

R (3) Place mast in position, carefully aligning holes with
R holes in fuselage skin.

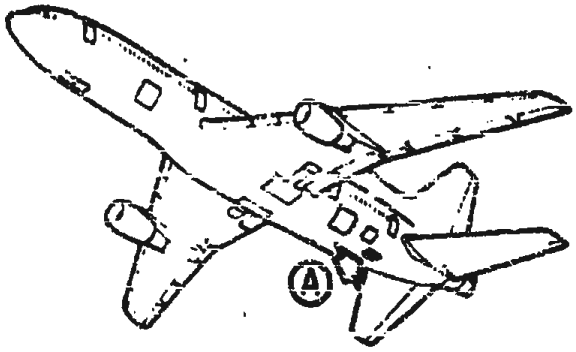
R (4) Install mast attachment bolts.

R (5) Remove sealing compound that extrudes around baseplate,
R using cloth dampened with cleaner.

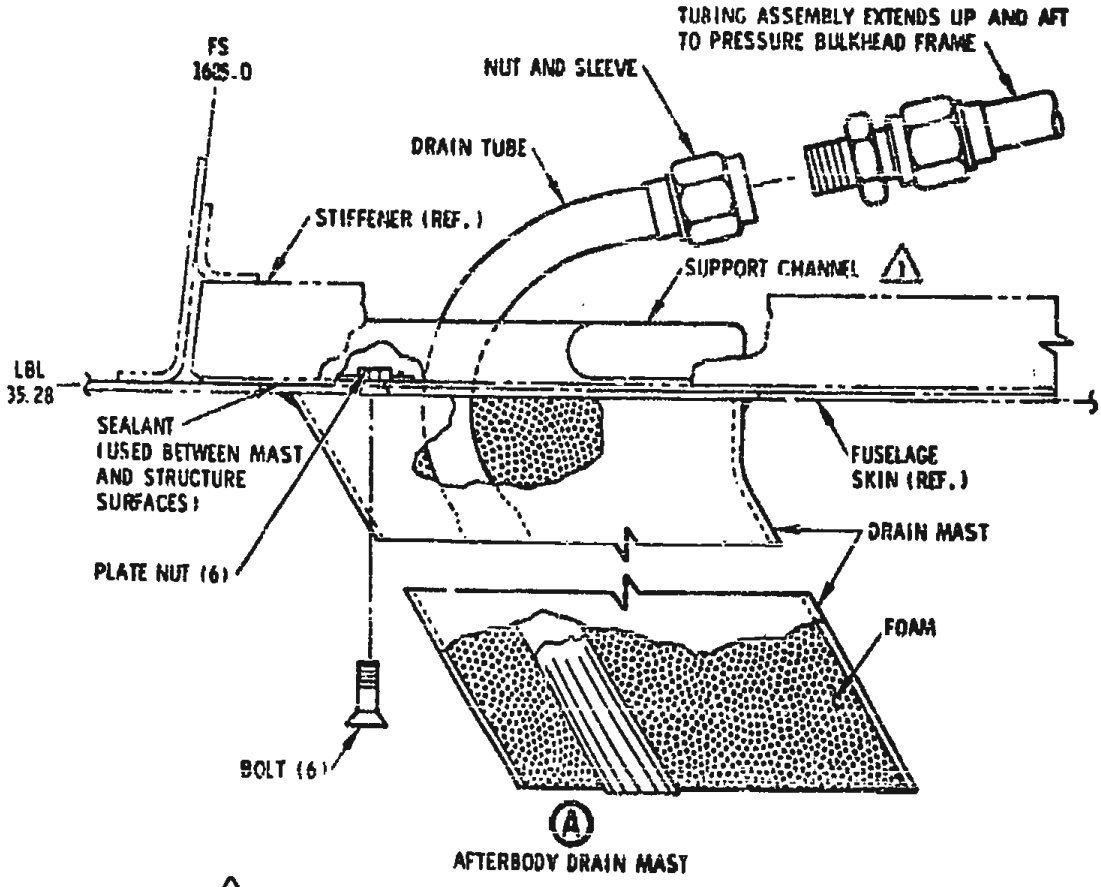
R (6) On inside of fuselage, reconnect mast drain tube with
R drain tube assembly.

R (7) Install aft cargo compartment floor panel 166HT.

R (8) Close aft cargo compartment door.



ZONE 168



AFTERBODY DRAIN MAST

1 THIS CHANNEL NESTS BETWEEN AND IS ATTACHED TO STRINGER NO. 38 AND A STIFFENER WHICH EXTENDS FROM FS 1685 TO FS 1705. CHANNEL ALSO ATTACHED TO FUSELAGE SKIN.

M1-0100-51-009

R R Afterbody Drain Mast - Removal and Installation
Figure 401

R R EFFECTIVITY: ALL

001B

R APU COMPARTMENT DRAIN MAST - REMOVAL AND INSTALLATION

R 1. General

R The APU compartment and aft shroud drain mast is located
R slightly aft of the aft pressure bulkhead in zone 316, FS 1834,
R LBL 39. Access to the nuts of the mast attachment screws and
R the mast drain tube nuts is through access door 316DB.

R 2. Equipment and Materials

R Sealing Compound - PR 1422-2 (Products Research Corp.), or
R equivalent

R Cleaner - Federal Specification O-T-620; 1, 1, 1,
R Trichloroethane, or equivalent

R 3. Referenced Procedures

R 6-40-00 Exterior Access Doors and Panels, Zone 300,
R Empennage and Afterbody

R 20-51-04 Environmental Sealing of Model L-1011 Airplane

R 4. Removal/Installation

R A. Removal

R (1) Open access door 316DB (Ref. 6-40-00).

R (2) Disconnect mast drain tube nuts (2) from APU
R compartment and aft shroud tubing assemblies (Ref. Fig.
R 401).

R (3) While holding mast attachment nuts, remove attachment
R screws (4). Retain screws, washers and nuts for reuse.

R CAUTION: USE CARE IN BREAKING SEAL BETWEEN MAST
R BASEPLATE AND FUSELAGE SKIN TO PREVENT DAMAGE
R TO THE SURFACES.

R (4) Remove drain mast from aircraft.

R B. Installation

R (1) Remove all sealing compound from mast baseplate and
R fuselage skin, using cloth dampened with cleaner.

R Assure that mast drain tubes are open and free of
R foreign material.

R (2) Apply thin layer of sealing compound, with brush, to
R mating surfaces of skin and baseplate (Ref. 20-51-04).

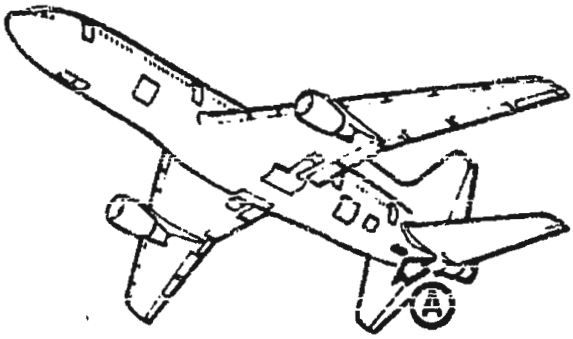
R (3) Place mast in position, carefully aligning holes with
R holes in fuselage skin.

R (4) Install mast attachment screws, washers and nuts.

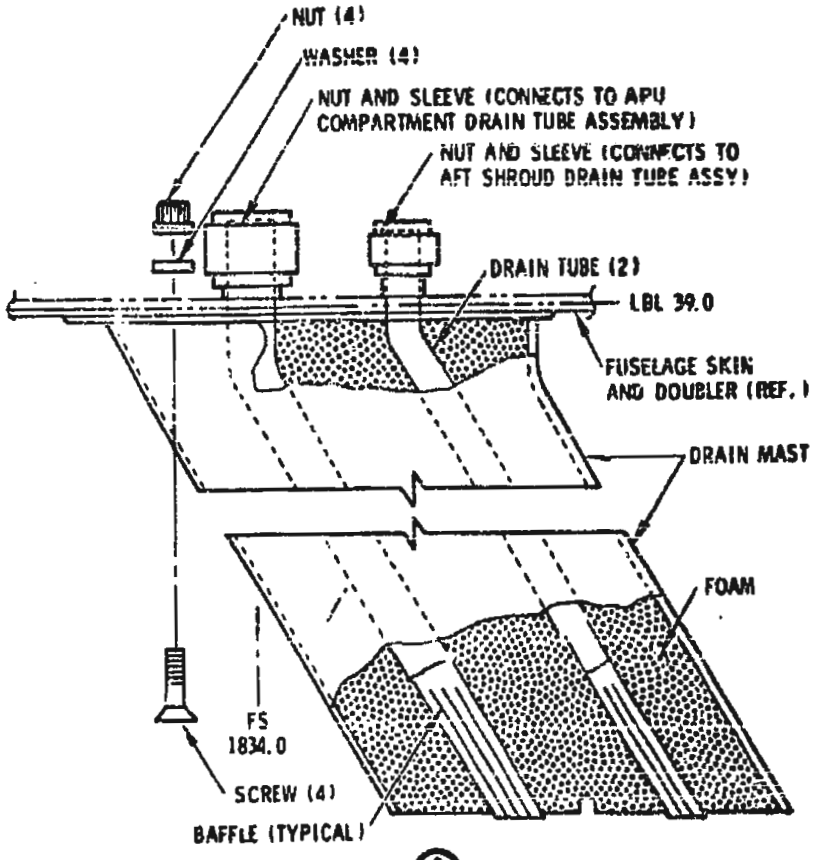
R (5) Remove sealing compound that extrudes around baseplate,
R using cloth dampened with cleaner.

R (6) On inside of fuselage, reconnect mast drain tubes with
R respective drain tube assemblies.

R (7) Install access door 316DB.



ZONE 316



APU COMPARTMENT DRAIN MAST

M1-0100-51-010

R APU Compartment and Aft Shroud Drain Mast - Removal and Installation
R Figure 401

R EFFECTIVITY: ALL
R
001B

R AFTERBODY COMPARTMENT FLUID DRAIN LINE - INSPECTION AND CHECK

1. General

The Fluid Drain Line is located between FS 2068 and FS 2215 and provides drainage for fluids which collect inside the vertical stabilizer.

Fluid is drained from the rudder servo compartment area in the vertical stabilizer and center engine support structure to an exit fitting at the aft end of the support structure fairing. The drain lines are periodically flushed out with an air operated solvent gun to assure that the lines are open and clean.

R On aircraft 001-036 with SB29-079,
R a drain line directs fluid from the rudder servo static valve
R relief port into the servo compartment drain line fitting.

2. Equipment and Materials

Filtered Air Source - 30 to 50 psi

Air Operated Solvent Gun

Clean Rag

Dry Cleaning Solvent, P-D-680, or equivalent

3. Reference Procedures

R 6-40-00 Exterior Access Door Panels

29-11-00 Hydraulic Power System - Maintenance Practices

4. Inspection/Check

A. Inspection

WARNING: VERIFY THAT ALL FOUR HYDRAULIC SYSTEMS ARE SHUT OFF (REF. 29-11-00). TAG FLIGHT ENGINEER/SECOND OFFICERS HYDRAULIC SYSTEM PANEL, ZONE 215 AND HYDRAULIC SERVICE PANEL, ZONE 147.

R (1) Remove following access panels (Ref. 6-40-00):

(a) Rudder hinge (324AL/AR)

(b) Engine rear mount (471EL/DR)

(2) At engine rear mount access area, hold a clean rag over drain opening to prevent debris from blowing back (Ref. Fig. 601).

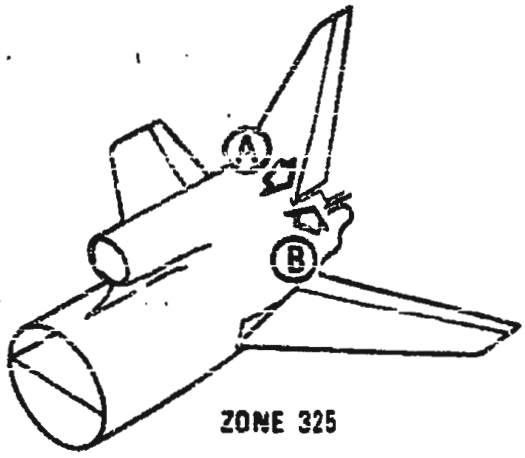
CAUTION: CLEAR PERSONNEL BELOW FLUID DRAIN OUTLET IN FAIRING ABOVE ENGINE TAIL CONE.

(3) At rudder hinge actuator compartment, use low pressure air solvent gun (30 to 50 psi) to flush drain line. Verify lines are free from blockage at drain outlet.

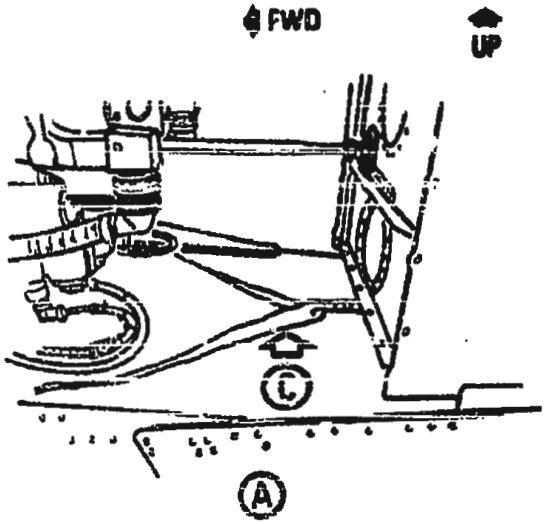
(4) At engine rear mount access area remove rag and flush drain line as in Step 4A(3). Verify lines are free from blockage at drain outlet.

(5) Reinstall access panels opened in Step 4A(1).

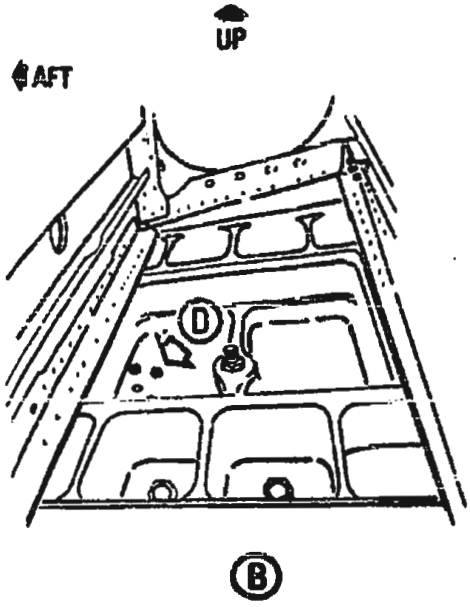
(6) Remove tags installed on Flight Engineer/Second Officers hydraulic system panel, zone 215 and hydraulic service panel, zone 147.



ZONE 325



RUDDER HINGE ACTUATOR COMPARTMENT



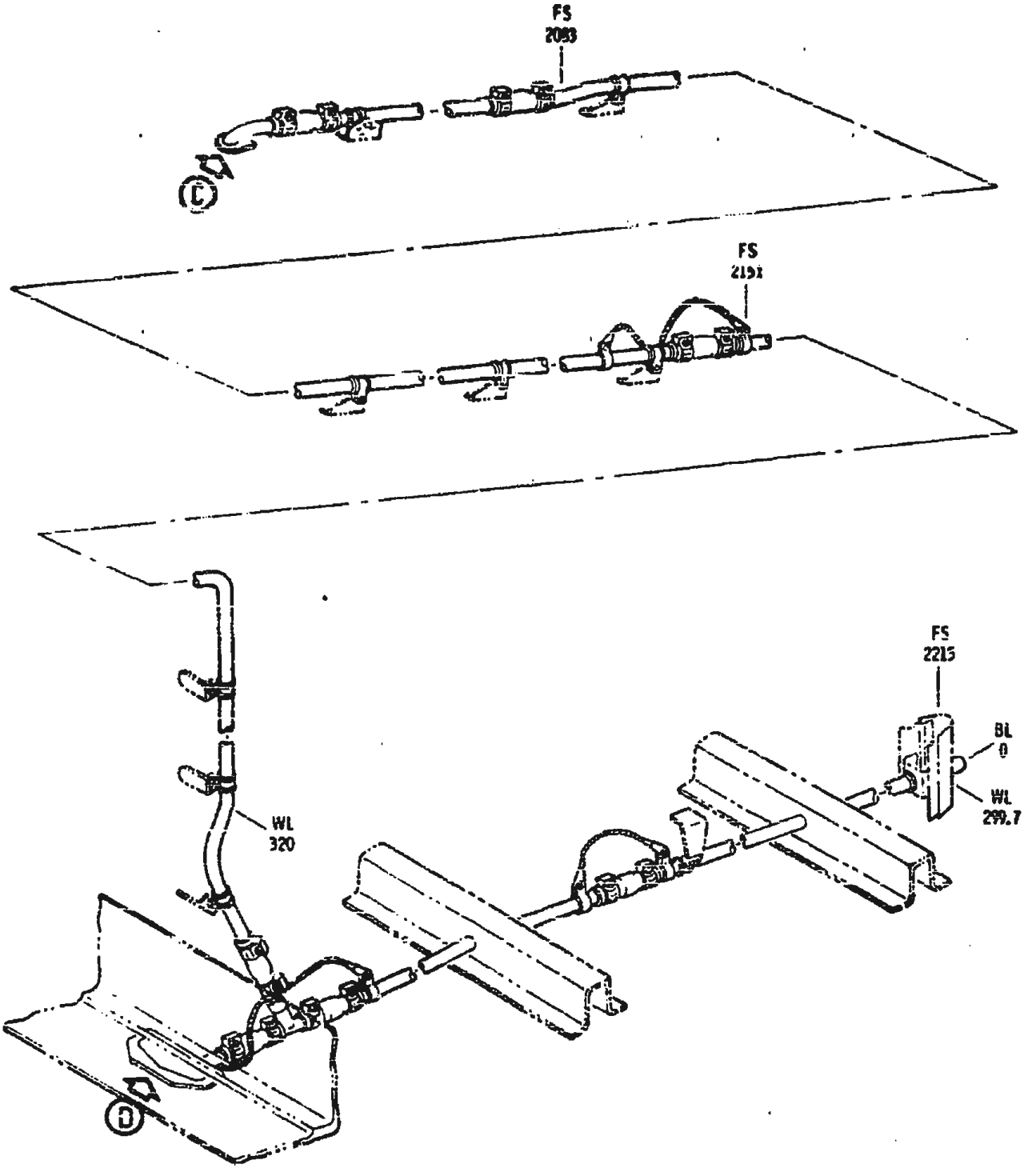
ENGINE REAR MOUNT ACCESS AREA

M1-0001-51-020

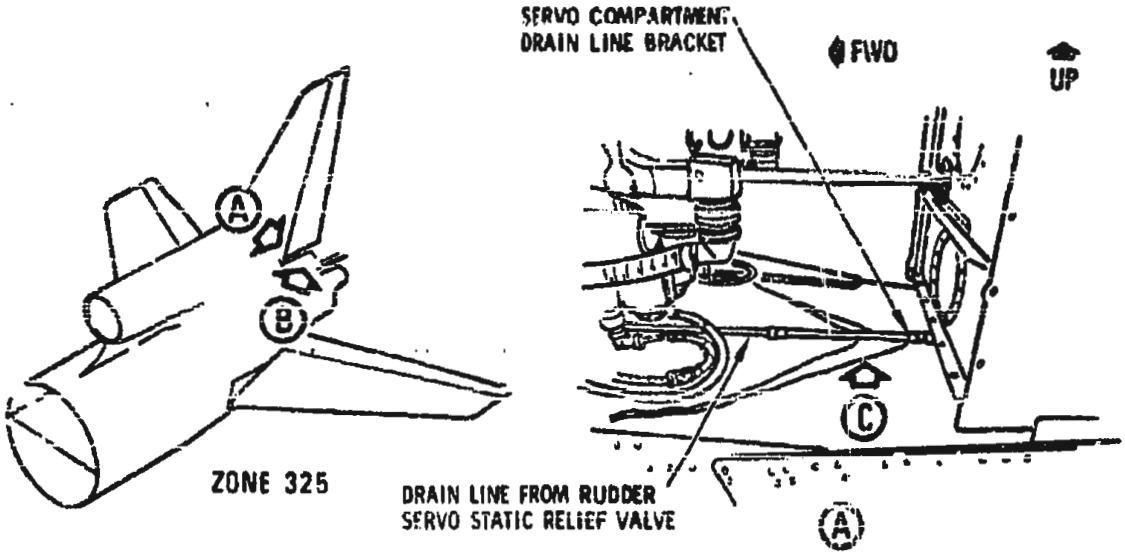
R Afterbody Compartment Fluid Drain Line
R Figure 601 (Sheet 1)

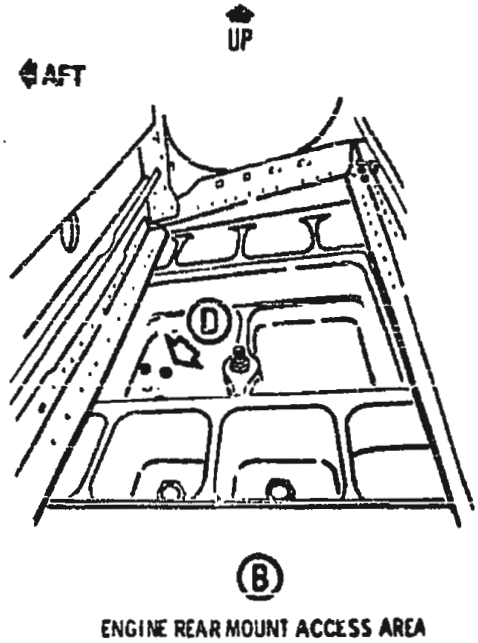
EFFECTIVITY: 001-036 WITHOUT SB29-079

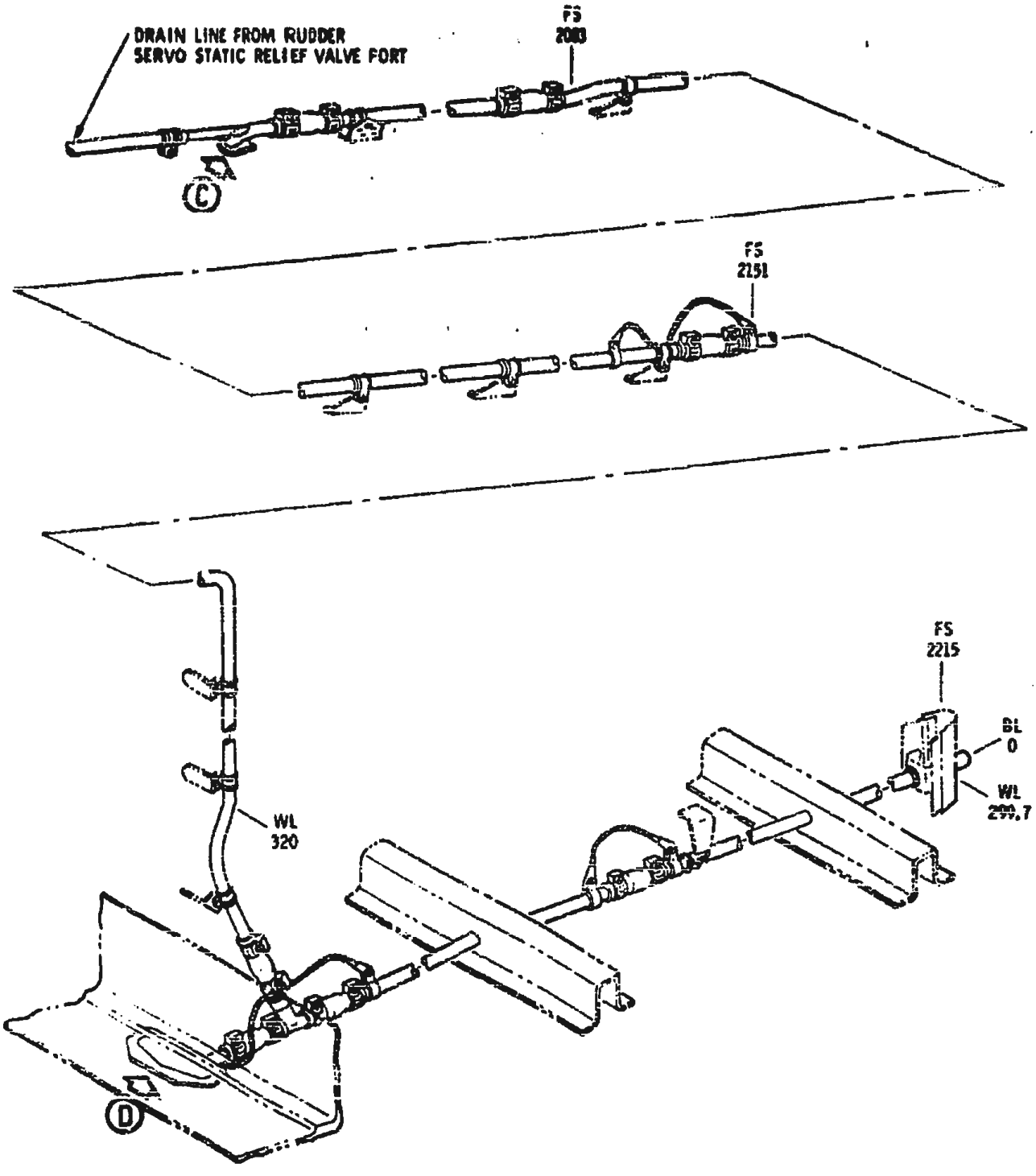
001B



Afterbody Compartment Fluid Drain Line
Figure 601 (Sheet 2)


SERVO COMPARTMENT
DRAIN LINE BRACKET
FWD
UP
A
B
C
ZONE 325
DRAIN LINE FROM RUDDER
SERVO STATIC RELIEF VALVE
A
RUDDER HINGE ACTUATOR COMPARTMENT


UP
AFT
D
B
ENGINE REAR MOUNT ACCESS AREA



M1-0000-51-000

R Afterbody Compartment Fluid Drain Line
R Figure 601 (Sheet 2)